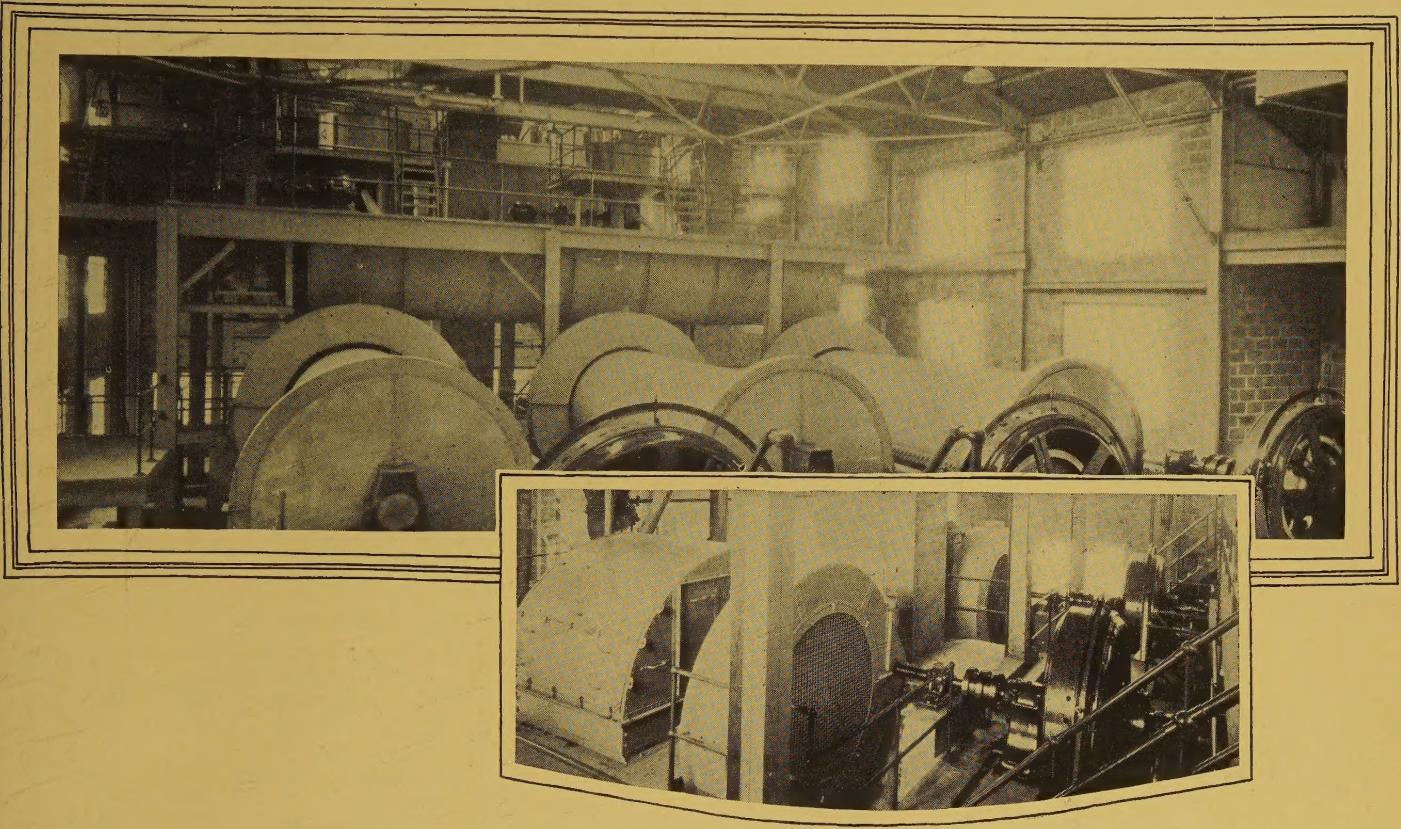
MILL SECTION of
Concrete



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The WET KOMINUTER takes run of crusher or hammer mill material, reducing it to a uniform size ideal for tubemill feed.

The TUBEMILL takes kominuter product, reducing it to a uniform fineness, which in the cement industry is so essential for good kiln feed.

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Both Kominuter and Tubemill embody the benefit of experience gained from constant contact with grinding problems over a period of thirty years. The Kominuter and Tubemill form an ideal combination for the grinding and pulverizing of all refractory materials.

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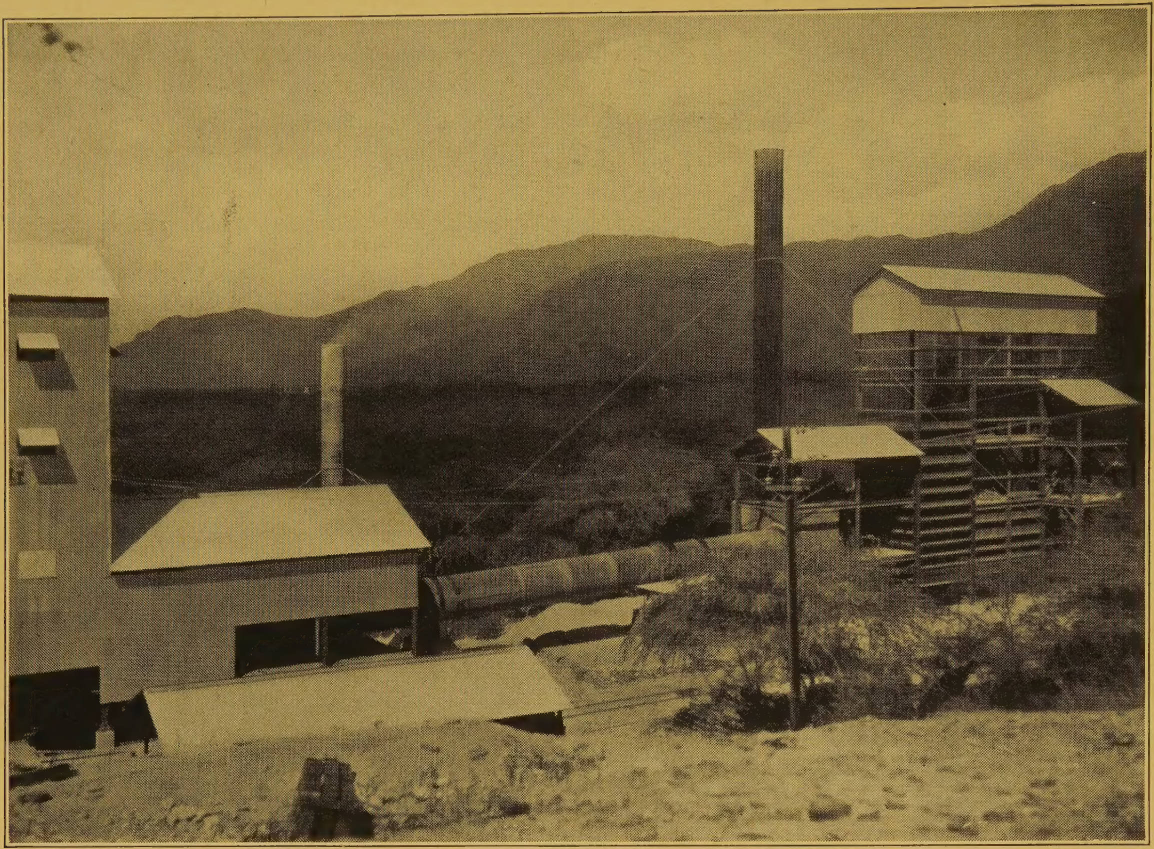

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MILL SECTION of Concrete

The Cement Mill Edition of Concrete is edited exclusively for those interested in the manufacture of cement. Its pages are devoted to discussions of plant design, management, operation, production efficiency, chemical research and control, quarry operation, progress and news of the industry.

The Cement Mill Edition also contains all the material published in the corresponding Regular Edition and so provides news of the uses and merchandising of the materials whose manufacture is discussed in the Mill Edition. The Regular Section furnishes mill operating officials and mill executives valuable points of contact with the users of the materials they produce.

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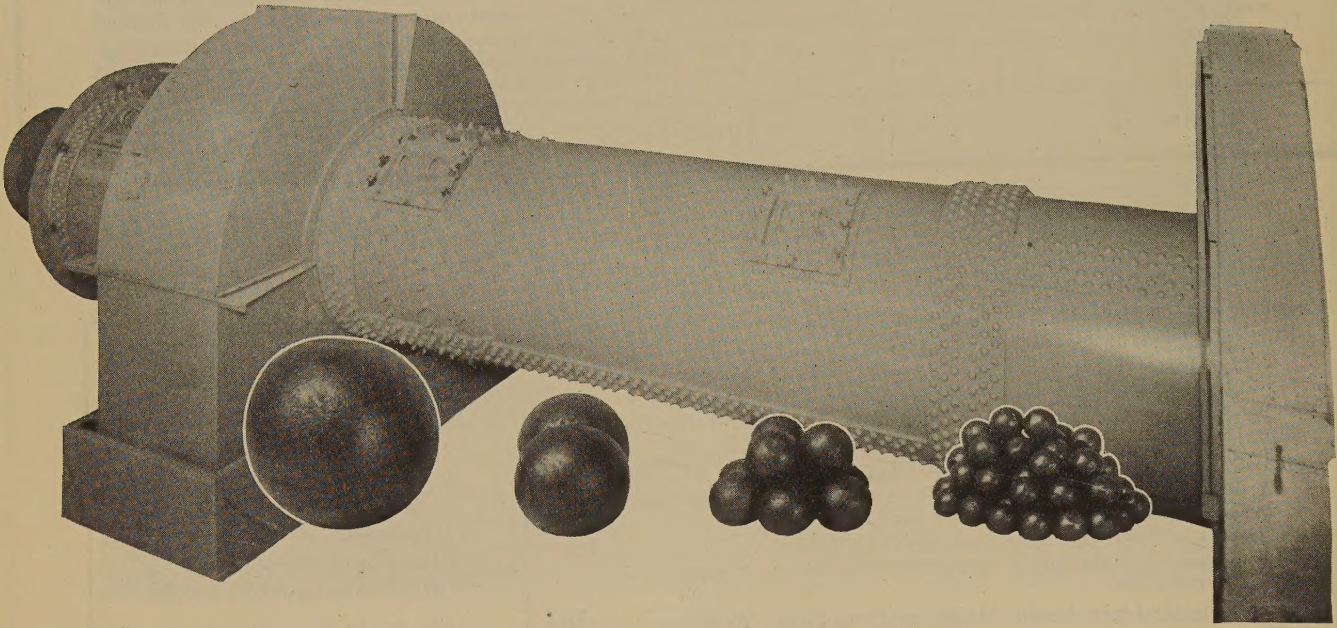

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MILL SECTION of

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Vol. 32 Chicago, June, 1928 No. 6

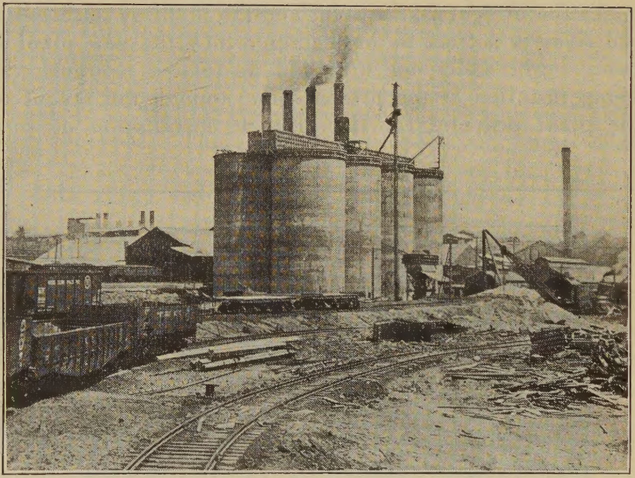
Construction of High Early Strength Cement Plant for Missouri Portland Cement Co. Under Way

New Plant Located Adjacent to Present St. Louis Plant of Missouri Portland Cement Company—Will Use Same Sources of Raw Materials—New Plant an Independent Unit—Will Make "Prestolith," a 24-Hour Cement—Plant Description—Long Kiln

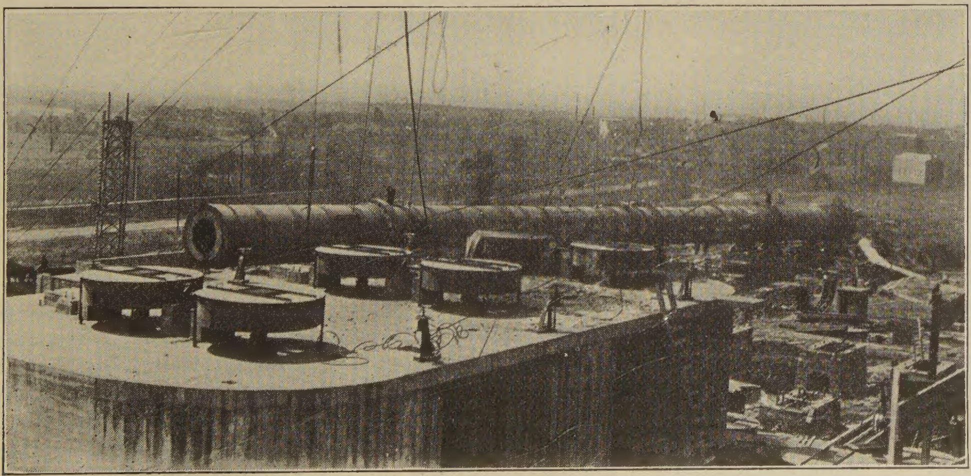
MANY of the plant structures for the new St. Louis mill of the Missouri Portland Cement Company are already concreted and equipment is now being installed. Construction progress on the silos, stack, slurry tanks and buildings was somewhat delayed because of difficult foundation conditions which necessitated carrying the foundations of the structures down to dependable bearings on caissons.

The new plant, which is located immediately adjacent to the present St. Louis mills of the company, will manufacture a Velo cement which will be marketed under the trade name of "Prestolith." A limited amount of this cement has already been made at the present plant at St. Louis and some of it has been used in pavement bases at intersections on busy St. Louis streets where traffic delays had to be reduced. The new plant is being constructed for the purpose of manufacturing Presolith more economically than is possible at the old plant.

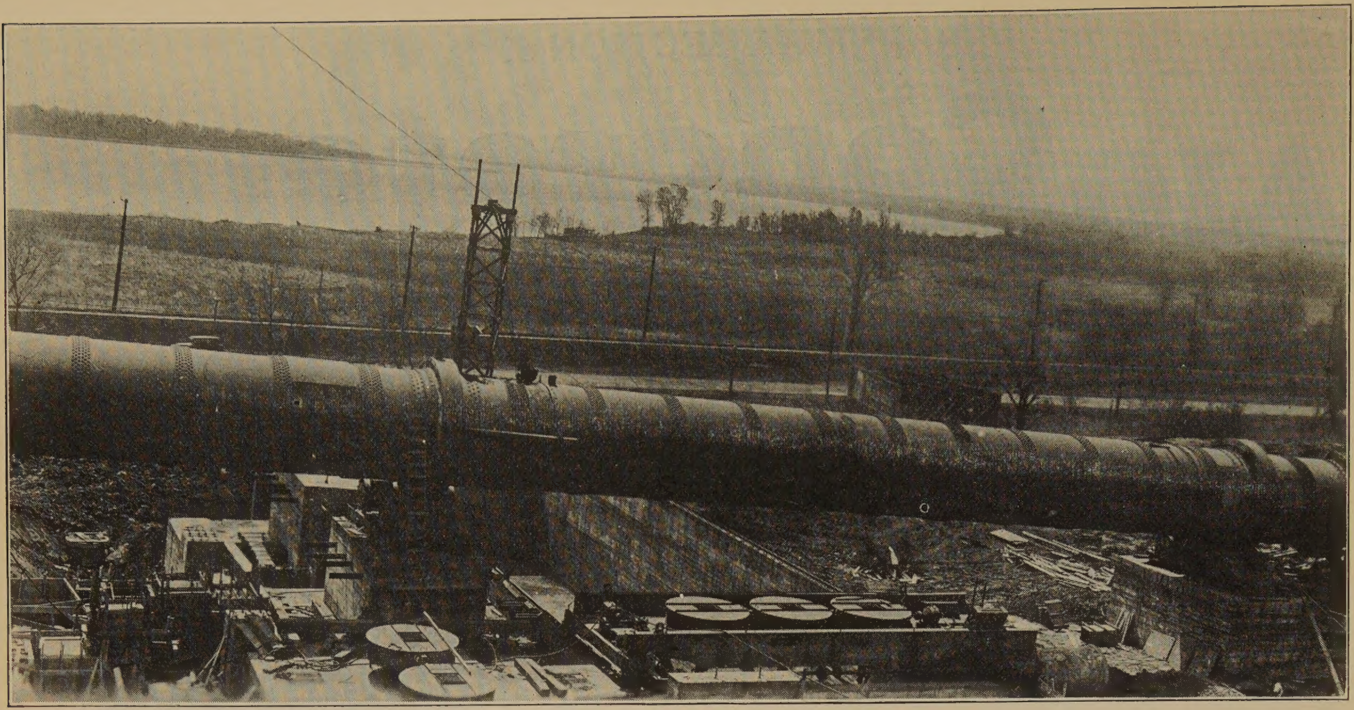
The present plant of the Missouri Portland Cement



The cement storage silos. In the background and to the left is the present mill

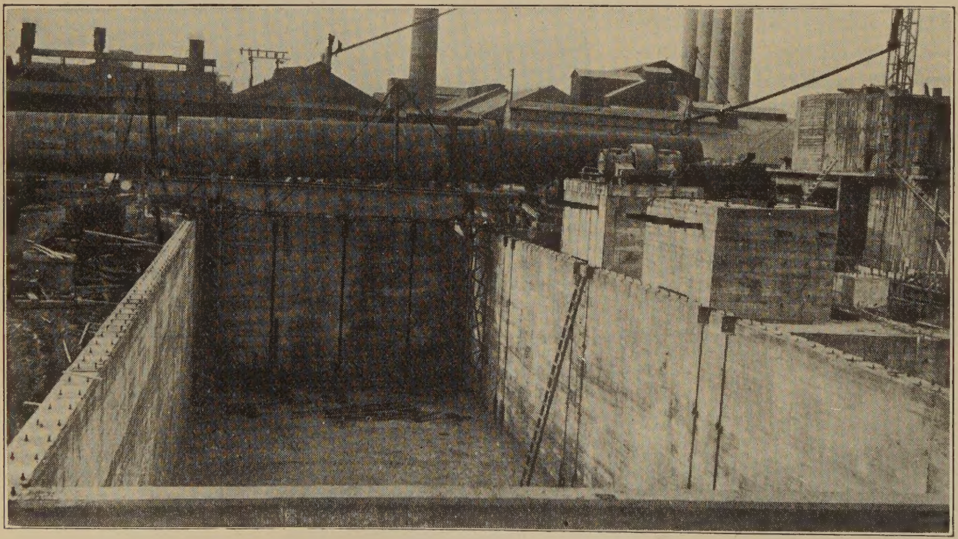


The slurry basins and kiln as seen from the rock storage silos



Installing the 311-*ft. kiln. In the background is the Mississippi River*

Company is located about 10 miles northwest of the center of St. Louis near the shore of the Mississippi River. Between the present 7-kiln plant and the highway paralleling the river is a tract of land upon which the new plant is being built. Only one kiln and its related equipment is being installed at the present time, though the layout of the plant provides for the ultimate installation of four kilns. The single kiln plant will produce 2,000 barrels of cement daily.



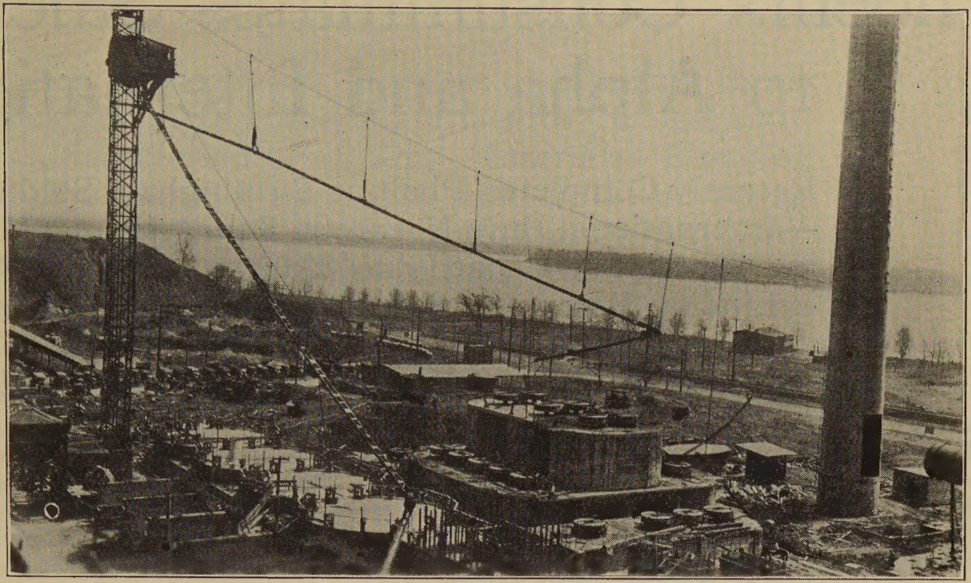
The rectangular slurry storage basin is located under the kiln

Raw Materials

The raw materials to be used for the new plant will be taken from the same sources as those now being used in the present plant. Limestone will come from the company's quarry eight miles distant and shale and rlay will be taken from the pits now being operated on the plant property. Limestone will be received on railway bottom dump cars. Clay and shale will come in on quarry cars. Preliminary crushing of the limestone will be effected at the quarry.

When the raw materials are dumped at the plant, a Beaumont skip hoist elevates them into the storage silos. There are two silos each for clay and limestone, 35 ft. in diameter by 60 ft. high. Two Dixie hammermills, one for shale and one for limestone, reduce the materials to 1-in. size, after which they are again stored in silos.

The raw materials are fed to a No. 20 Unidan mill and a No. 20 tube mill, both made by the F. L. Smidth Company. Approximately 35 per cent of moisture is added as the materials enter the raw grinding mills.

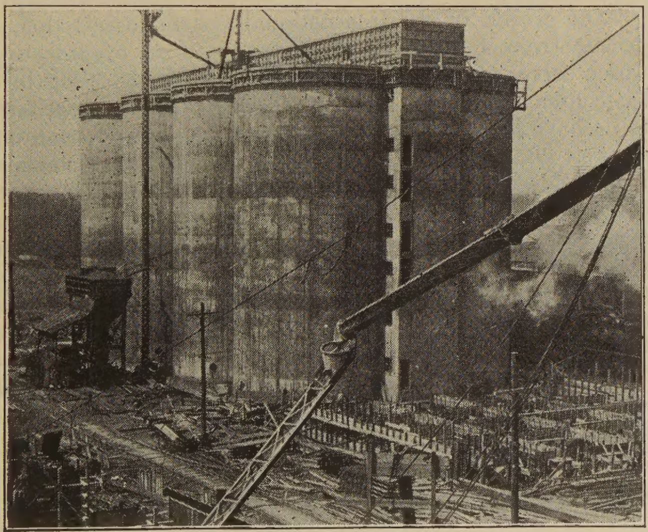


A general view of the slurry storage and correction tanks. The kiln stack is shown on the right

A Wilfley pump then conveys the slurry to the three correcting basins, each 20 ft. in diameter and 21 ft. deep. After final blending is accomplished, the slurry is pumped to the large rectangular slurry storage basin located under the kiln. Stationary F. L. Smidth agitators are installed in the correcting basins and a traveling agitator is installed on the slurry storage tank.

Kiln

The single kiln installed at the present time is of F. L. Smidth make and is 311 ft. long. The calcination zone is 11 ft. 3 in. in diameter and the balance of the kiln is 10 ft. in diameter. The kiln is equipped with a Unax cooler.*



The cement storage silos with forms in place for the head house

Clinker is taken from the cooler and placed into four silos, each 35 ft. in diameter by 60 ft. high, for storage. A Cylcup conveyor handles the clinker from the cooler into the silos.

Cement Handling

Another Cylcup conveyor takes the clinker from the storage silos to the feed hoppers supplying the finish grinding equipment. This also consists of a No. 20 Unidan mill and a No. 20 tube mill of F. L. Smidth make. A Fuller-Kinyon system conveys the cement from the mills to storage. There are eight cement storage silos, 32 ft. by 70 ft.

An F. L. Smidth Pyrator is used for drying and grinding the coal. This feeds a Fuller-Kinyon pump which conveys the pulverized coal to the kiln feed bins.

Falk speed reducers were used throughout the plant. All the motors were furnished by the Westinghouse Electric and Manufacturing Company. Power is purchased from the Union Electric Light and Power Company.

Personnel

The plant was designed by the F. L. Smidth Company of New York, who are also supervising its construction. The Fruin-Colnon Contracting Company of St. Louis are the general contractors.

The Gamble Construction Company are building the silos and the John V. Boland Construction Company built the kiln stack.

Officers of the Missouri Portland Cement Company are H. L. Block, president; C. A. Horner, George M. Block, C. G. Besch, vice-presidents; D. A. Armstrong, vice-president and general manager, and George Ross, assistant general manager and superintendent.

Engineers Fell Indiana's Reinforced Concrete Stack

The Indiana Portland Cement Company, until a short time ago, had at its plant at Greencastle, Indiana, a 220-foot reinforced concrete stack that recently had to be removed. The Rust Engineering Company of Pittsburgh, given the task of razing the stack, went about it in this manner: A portion of the stack was cut away at the bottom. This weight was taken by heavy timbers. On the opposite side of the stack, workmen burned the reinforcement away with torches. The timber was then set afire. The stack toppled over neatly in the direction intended.

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*A detailed description of the Unax cooler was given in the article on the Birmingham plant of the former Phoenix Portland Cement Corporation, in the August, 1927, issue of CONCRETE.

Phoenix Consummates Sale of Plants to Alpha and International

Recently Completed Plant at Birmingham Sold to Alpha —International Buys Nazareth, Pennsylvania, Mill, Raising Productive Capacity to 20,000,000 Barrels Annually —Lindley Morton Retiring from Activity in Cement Industry—International Also Purchases Demopolis, Alabama, Plant of Warrior Cement Corporation

THE organizations known as the Phoenix Portland Cement Company and the corporation of the same name have been entered in the archival records of the cement industry with the sale of their two plants, one at Birmingham, Alabama, and the other at Nazareth, Pennsylvania, to the Alpha Portland Cement Company and the International Cement Corporation, respectively.

Alpha Productive Capacity

As a result of its barter, Alpha owns a cement plant built in 1926 and which began operations in 1927, one that is well designed, modern in every way, and has ample reserves of raw material and equipment capacity. The acquisition will increase the productive capacity of the purchaser to 12,500,000 barrels yearly.

Alpha now owns, in addition to its operation at Martins Creek, Pa., plants near Catskill, N. Y., near Syracuse, N. Y., at Manheim, W. Va., at Ironton, Ohio, at Bellevue, Mich., and at La Salle, Ill., near St. Louis, Mo., and through its purchase of the Morton plant in Birmingham is very well equipped to take care of cement business throughout the territory east of the Mississippi river in addition to the territory served from its St. Louis mill.

Wood, Struthers & Co., a New York financial house, has contracted to underwrite an issue of 118,500 new common shares at $37 a share in ratio of one share of new stock for each five shares of existing common stock.

The former Phoenix plant at Nazareth will be operated by the Lone Star Cement Company of Pennsylvania, a subsidiary of the International Cement Corporation. Its principal office will be located in Philadelphia.

Warrior Plant Absorbed

The International corporation has closed negotiations also for the purchase of a southern plant—that of the Warrior Cement Corporation at Demopolis, Alabama. This will be operated by the Alabama Portland Cement Company, the International subsidiary which operates the plant at Birmingham. The Warrior plant is to be known as Plant No. 2 and the Birmingham mill as Plant No. 1.

H. Struckmann, president of the International Cement Corporation, is president of both the Alabama and Pennsylvania subsidiaries. The other officers of the Lone Star Cement Company of Pennsylvania include C. L. Hogan, vice-president; H. H. Muehlke, secretary and treasurer; D. S. MacBride, manager. The other officers of the Alabama Portland Cement Company include J. W. Johnston, vice-president and manager; C. C. Duff, treasurer; H. H. Muehlke, secretary, and R. M. Walker, sales manager.

The thirteen mills which now comprise the International system are operated by eleven subsidiary companies, the stock of which is owned in whole or in major part by the International Cement Corporation. Besides the mills at Birmingham, Demopolis and Nazareth, the International system includes a plant at Hudson, N. Y., serving the New York-New England market; one at Greencastle, Ind., serving the Central West; one at Kansas City, Kansas, serving the West, the Norfolk mill serving Virginia and adjacent states, a plant at New Orleans and two mills located at Dallas and Houston serving Texas and the Southwest, in addition to plants in Cuba, and Uruguay and Argentina in South America.

President's Statement

In announcing the purchase of these plants, President Struckmann said:

"With the acquisition of the mills at Nazareth, Pa., and Demopolis, Ala., the International system now serves the entire territory east of the Rocky Mountains, in addition to Cuba and Uruguay and the Argentine in South America. With its present total productive capacity of 20,000,000 barrels of Lone Star cement, the International system now ranks among the largest cement producers in the world.

"The growth of the International system in less than a decade from a single local company to an organization which serves two continents has proceeded according to a basic plan under which the locations of the International mills have been selected in proximity to large consuming markets and abundant supplies of excellent raw materials. Under this basic plan the factor of variation in business conditions in different parts of the United States has been comprehended and the International mills are all located in sections no two of which are dependent for their prosperity upon the same set of economic or business conditions. In this manner the effect of business depressions local to any one community is minimized.

"The seasonal trend in cement consumption is also comprehended in this basic plan. In the North the season is necessarily shorter than in the South. The International Cement Corporation has northern and southern mills, as well as its Cuban and South American properties. Because of this far-flung distribution of its mills, the effect of seasonal consumption is reduced to nominal proportions.

"The domestic mills of the International system have been so located that if one mill is confronted by an emergency demand for cement that it is unable to meet, another adjacent International mill can quickly come to its assistance, thus assuring uninterrupted service to cement users no matter how great the emergency."

All of the International subsidiaries will also distribute Incor cement.

Dry Blending of Raw Materials

A Description of the Newer Methods of Effecting Satisfactory Blending of Dry Raw Materials for Cement Manufacture—Characteristics of Dry Materials—Blending Action of Automatic Distribution and of Withdrawing Materials from the Bins—Reducing the Mill Stream Error—Some Typical Installations

RECENTLY there have been a number of notable improvements made in the handling of raw materials in dry process plants. With the adoption of these newer methods, improvements of far-reaching importance have been made in many of the older dry process plants and, in at least one instance, a new, modern cement plant was planned and erected using the improved dry blending methods. In this article, the operation of the improved methods of dry blending is described and illustrated.

The Fuller-Kinyon conveying system has recently been adapted for mixing and blending dry pulverized raw materials, with a method involving several novel steps that are based upon the peculiar characteristics of dry materials. The systems are arranged to effect the mixing and distribution of materials completely by timed automatic control. The systems are subject to modification by remote control of the sequence of operation and the direction of material flow to provide for possible variations in the composition of the various materials handled.

Several cement plants practicing this new method have demonstrated that a sound, uniformly high quality cement can be made by the dry process without sacrificing its economies or requiring an unreasonable supervision. In several plants wide variations in the mill stream composition were reduced within proper operating limits by simple systems. There is also an indication that in addition to quality in the finished cement, kiln operating conditions and production are improved.

Characteristics of Dry Materials

In view of the peculiar characteristics of dry pulverized materials as a whole, and the physical variations in the individual constituents of cement raw materials, no attempt was made to follow wet practice although one system has several similar features. In general, the present method is distinctly different from the wet process and was arranged deliberately to take advantage of the behavior of dry materials both in handling and in storage. As examples of this, pulverized materials as transported or pumped by the Fuller-Kinyon conveying system are in an aerated condition and have no tendency to separate or classify according to specific gravity or fineness. When discharging into a receiving bin, the materials assume a flat or hydrostatic level due to this fluent condition, and when two or more systems discharge simultaneously into the same bin, a partial mixture results from the turbulent flow.

The method has been successfully applied to old and new plants, and it was neither necessary nor desirable to modify former practice, governed by local quarry or supply conditions, in obtaining the preliminary raw mixture. It is admittedly possible theoretically to obtain a supply of finely ground raw materials of the desired composition suitable for burning by any of the present practices in blending the materials from the quarry either in storage or not, as well as to obtain the blend with the continuous addition of small quantities of one or two constituents such as limestone, clay or shale. Although the entire bulk may have the proper composite analysis, it by no means follows that the kiln feed will be accurate from minute to minute and from hour to hour. Several factors over which the chemist has little or no control may cause this error variation in the mill stream to vary widely and ununiformly. The error variation may be due to the difference in grindability of the various materials; to a tendency for crushed materials to classify according to specific gravity or fineness both in storage and in transportation; or to mechanical difficulties in mixing materials such as limestone, clay or shale with the main bulk of materials at a uniform rate.

Accordingly, if a composite analysis of several hours' or several days' run of material would indicate a proper blend, a very useful function of the system would be to effect a mixture having or approximating the desired predetermined chemical as well as physical analysis, rather than to modify particularly the practice in obtaining the original raw material mixture, although this has been done at one plant.

Blending Action of Discharging Bins

One of the factors contributing to the mixture is due to the characteristic of dry pulverized materials when withdrawn by gravity from a storage bin or silo to form "pipes" or "ratholes" above the discharge spouts throughout the entire height of the material in the bin. Materials thus discharged are the product of almost all levels from top to bottom rather than the lowermost material in storage. Advantage of this is taken in the present system by forming thin flat layers in each bin automatically, these layers being composed of a fraction of the mill stream load. Equal fractions of materials are withdrawn from each of the raw storage silos and recirculated, together with a small quantity of flue dust which is delivered as it accumulates.

The two systems described in detail below are arranged to perform the complete method, although the practice is somewhat different in each case. Very good results have been obtained with less complete layouts, but with the sacrifice of some of the flexibility of control and convenience in operation. One of the most interesting installations is shown in Figure 1. This arrangement is such that the entire system will operate continuously without supervision if the mill stream error does not vary beyond usual conditions. If this takes place, the automatic operation can be modified by remote control. Or, if the error variation is not excessive, the circulating system can be placed out of operation, likewise by remote control. If the kiln bins become completely filled, distribution automatically ceases to the kiln bins and a visible indication is made on the control and signal panel.

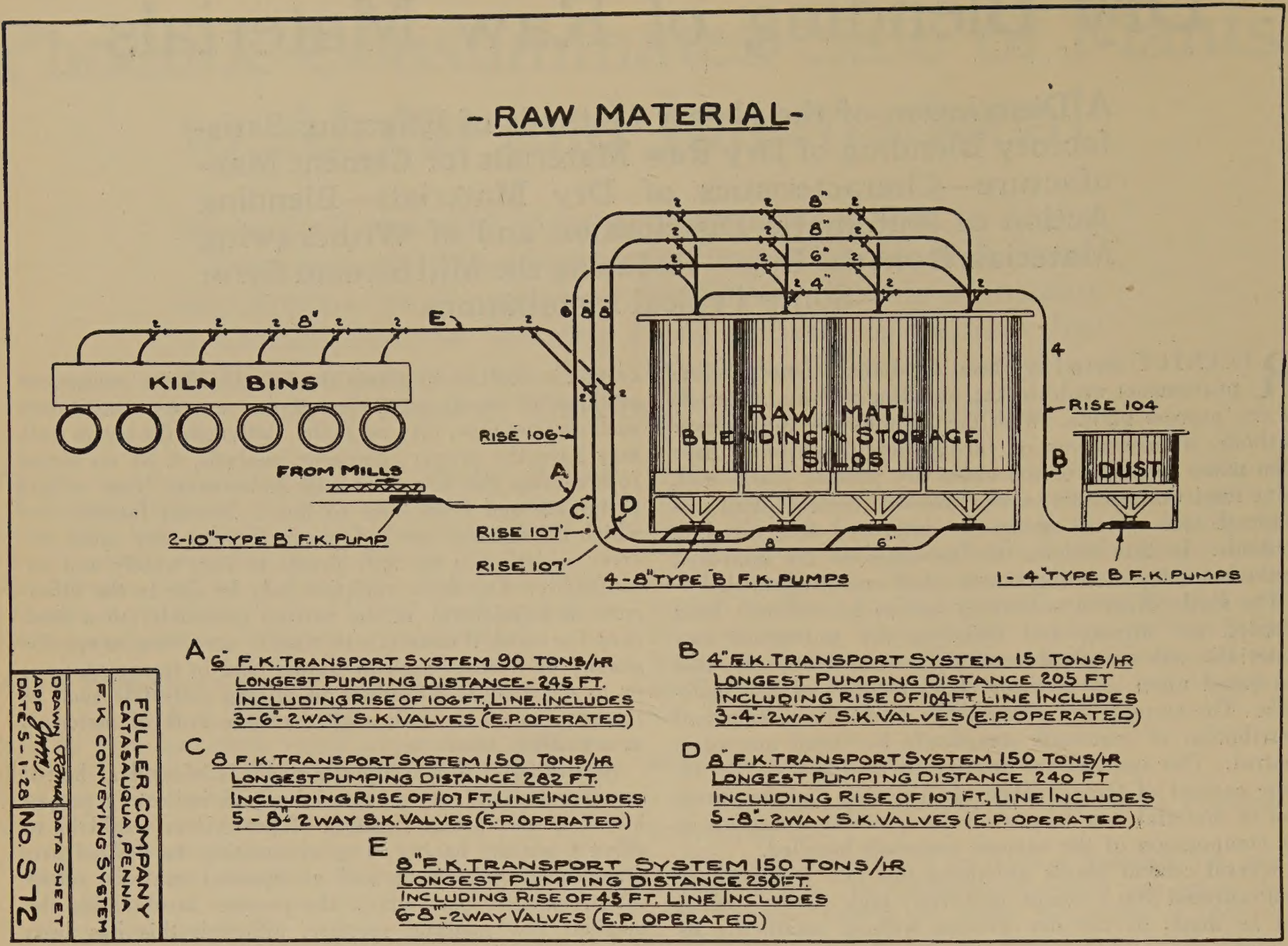

-RAW MATERIAL-
KILN BINS
FROM MILLS
2-10" TYPE B 8" F.K. PUMP
RISE 106'
RISE 107'
RISE 107'
RAW MATL. BLENDING & STORAGE SILOS
DUST
RISE 104
4-8" TYPE B F.K. PUMPS
1-4" TYPE B F.K. PUMPS
A
B
C
D
E
8"
6"
4"
A 6" F.K. TRANSPORT SYSTEM 90 TONS/HR
LONGEST PUMPING DISTANCE - 245 FT.
INCLUDING RISE OF 106 FT., LINE INCLUDES
3-6"-2 WAY S.K. VALVES (E.P. OPERATED)
B 4" F.K. TRANSPORT SYSTEM 15 TONS/HR
LONGEST PUMPING DISTANCE 205 FT
INCLUDING RISE OF 104 FT. LINE INCLUDES
3-4"-2 WAY S.K. VALVES (E.P. OPERATED)
C 8 F.K. TRANSPORT SYSTEM 150 TONS/HR
LONGEST PUMPING DISTANCE 282 FT.
INCLUDING RISE OF 107 FT., LINE INCLUDES
5-8"-2 WAY S.K. VALVES (E.P. OPERATED)
D 8" F.K. TRANSPORT SYSTEM 150 TONS/HR
LONGEST PUMPING DISTANCE 240 FT
INCLUDING RISE OF 107 FT., LINE INCLUDES
5-8"-2 WAY S.K. VALVES (E.P. OPERATED)
E 8" F.K. TRANSPORT SYSTEM 150 TONS/HR
LONGEST PUMPING DISTANCE 250 FT.
INCLUDING RISE OF 45 FT. LINE INCLUDES
6-8"-2 WAY VALVES (E.P. OPERATED)
FULLER COMPANY
CATASAUQUA, PENNA
F. K. CONVEYING SYSTEM
DRAWN
APP
DATE 5-1-28
DATA SHEET
NO. S 72

Figure 1

Blending Action of Automatic Distribution

Each of the distributing valves in the system operates automatically in a predetermined sequence, and for a definite interval, the interval being best explained by the layer composition shown in Figure 2. This figure illustrates the nature of the materials in storage in any one of the four bins and is the result of three deliveries to one bin in relation; for example, to the first, fifth and ninth time interval. Assuming that the entire system is in operation during the first interval, the mill stream is delivered to the first bin, and as all valves above the silos are synchronized, material is simultaneously discharged into the same bin from the third and fourth silos, all three at the same tonnage. At the same time a quantity of flue dust is discharged. The independent pumps under the first two silos are, in the meantime, withdrawing material and delivering it through the branch line to the kiln bins, which will not receive material again before the thirteenth interval.

During the fifth interval, equal quantities of mill stream and materials drawn from each of the four silos and the small quantity of flue dust will be discharged into the first silo at the same time to form a thin, flat layer partially mixed by the turbulent action of the four discharging streams. During the sixth, seventh and eighth intervals, materials are being delivered to the other silos in similar quantities and at similar intervals, and returns made to the first silo in the ninth interval as indicated in the top or ninth interval layer in the figure.

Obviously, although the fifth interval layer and ninth interval layer are products of the same source, there has been a variation not only in the mill stream itself, but

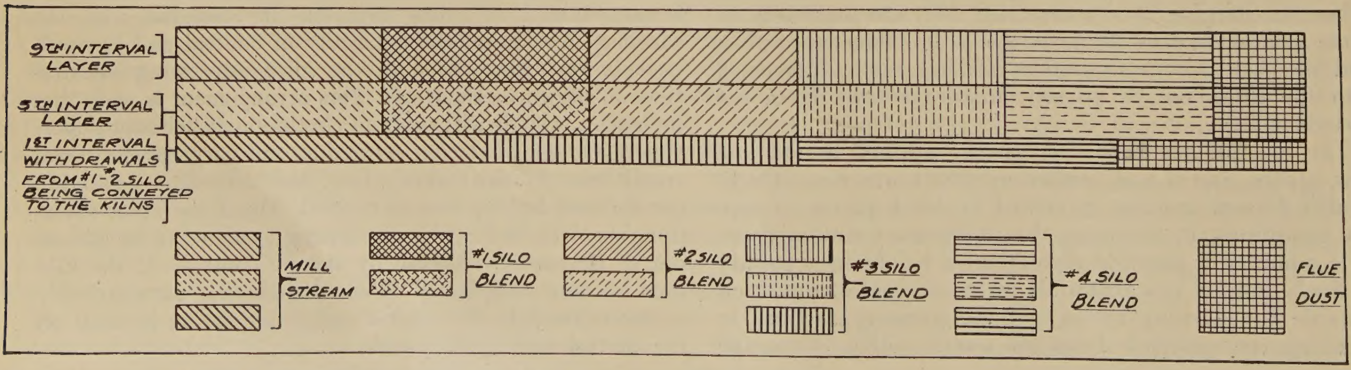


Figure 2. Elevation in section through one silo showing three layers. The side edges are the silo walls

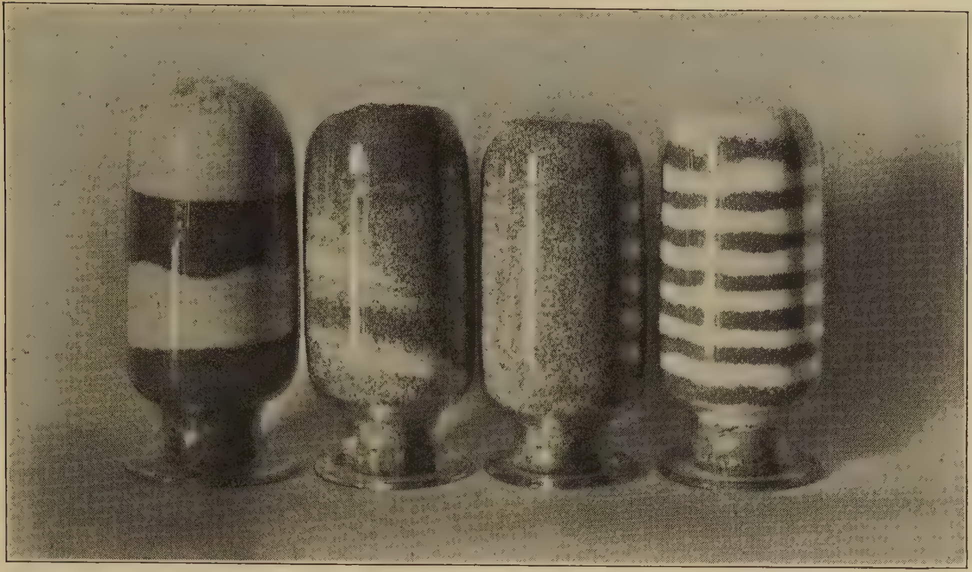


Figure 3. Simple illustration of the mixing effect due to withdrawing materials stored in layers. The material in the second bottle from the left shows the poor mixing resulting from the withdrawal of thick layers, similar to those in the first bottle. The third bottle shows the more complete mixture from thin layers similar to those in the fourth bottle

likewise in the circulated material due to blending in the withdrawals from the four silo bins. As these materials are withdrawn from storage through at least five spouts, the pipes or ratholes form throughout the entire height of materials, thus insuring a very fair degree of mixture as the layers run together during withdrawal.

Distributing Mill Stream Error

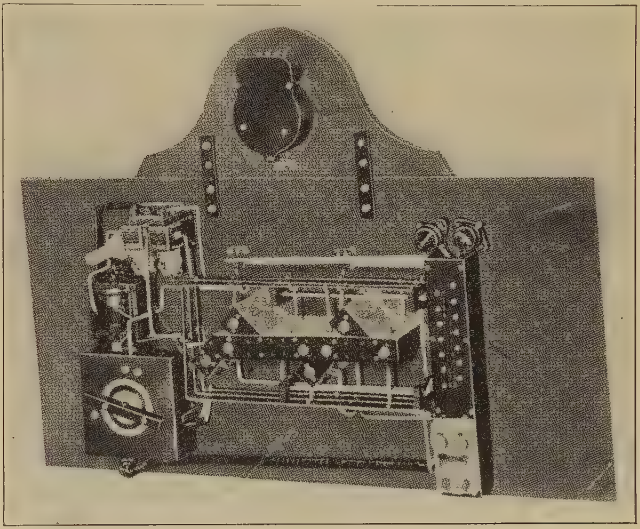
When the installation is operating as a unit, the most important factors contributing to the ultimate mixture are: (1) the spread of the mill stream error over the number of silos available, in this instance four; (2) the effect of collection, circulation and blending of the first two and the third and fourth silos by discharge into the same pipe lines and by delivery in sequence to each of the four bins; (3) the turbulent action of the four discharging streams; (4) the number of ratholes in each bin; (5) the delivery to the kilns intermittently and alternately from the first two and the second two silos; and (6) delivery to the kiln bins at similar time intervals to form thin, flat layers in the kiln bins, which run together similarly during withdrawal by the kiln feeders. When the bins are filled, the branch line over the kiln bins connected to the two withdrawal transport lines is bypassed out of service by the automatic control.

Control Panels

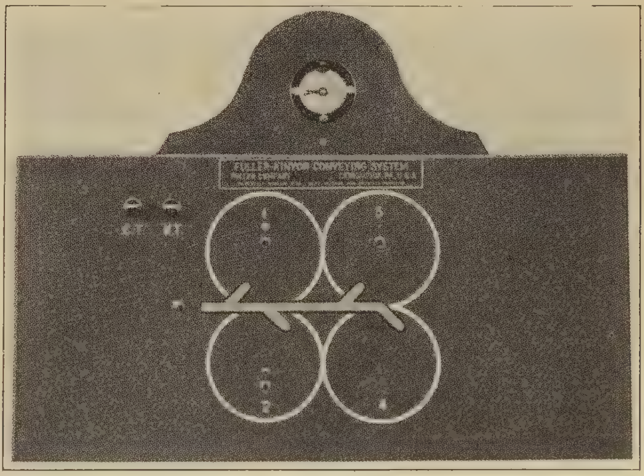
The control and signal panel for this system diagrammatically illustrates the layout and not only indicates the condition of the kiln bins, but also gives a visible indication of the direction of the flow of materials through the various lines at all times. Remote control push-buttons permit the chemist to modify the operation described above from his office or any convenient point.

Figure 3 is a simple illustration of the effect of ratholes in materials stored in thin, flat layers. Although the thickness must necessarily be much greater in proportion for this illustration, there is a very marked difference in the mixture of materials as discharged from the bottle on the left and that from the bottle on the right. When relatively thin layers are formed, the material, in this case white and red sugar, discharges into another bottle in apparently a complete mixture. Materials discharged from the bottle containing the thicker layers show very noticeable streaks of a lighter and darker material.

The system illustrated schematically in Figure 4 is arranged to practice a slight variation in the method. Ma-



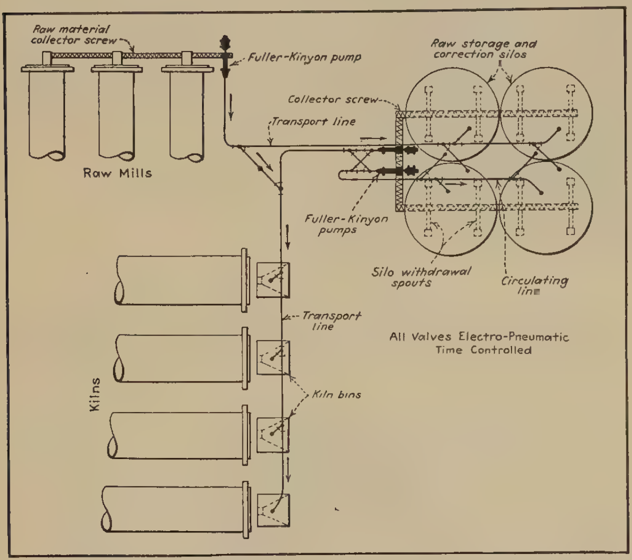
Rear view of a four-unit panel with casing removed to show the terminal block and valve operating mechanism



Four-unit control and signal panel with time interval clock and remote control push buttons terials are delivered similarly in thin layers to storage or may be by-passed directly from the mill collector screw to form similar layers in the kiln bins. Either of the two pumps below the raw storage silos can be used to circulate materials or deliver them to the kiln bins and either pump can serve as a spare for either system if it is either unnecessary to circulate or if the kiln bins are full.

Correcting Proportions of Raw Materials

The withdrawal and collection system is a little more complicated than that shown in Figure 1, both in equipment and drive, as feeders must be arranged above the screws if materials are to be proportioned for blending purposes. The system may be so arranged that blending may be accomplished by proportioning and correction. For example, if the normal materials are low in lime, the mill stream may be delivered and circulated in three of the four silos, and a high lime material delivered to the fourth bin. Blending is then accomplished by proportioning withdrawals from the first three and the fourth silos for effecting an ultimate mixture in collection and delivery, by the layer system, to the kiln bins.



Three 10-inch Fuller-Kinyon pumps for conveying and blending cement raw materials in an arrangement similar to that shown in Figure 3. The central pump is a spare and is connected to both systems. The maximum capacity of the circulating pump is 275 tons per hour

Many variations in the application of the method are possible as the piping system, the time interval, the sequence of flow and the layout of the storage silos, may be varied to meet specific plant conditions. If more storage silos are available, certain of the bins may be reserved to serve as storage for completely mixed kiln feed. Several plants prefer this practice in order to have sufficient supply of material on hand to carry them over Sundays and holidays when the quarry and raw milling departments are shut down.

Oklahoma Acquires New Site in Arkansas

The Oklahoma Portland Cement Company, Oklahoma City, has recently acquired a tract of 120 acres at Saratoga, Arkansas, upon which a cement plant will be constructed some time in the near future.

Urge Cement Manufacturers to Co-operate in Quarry Cost Study

In a letter to cement manufacturers, John J. Porter, chairman of the Committee on Conservation of the Portland Cement Association, urges them to join in a movement to be undertaken by the U. S. Bureau of Mines at the request of the crushed stone industry to make a detailed study of quarry costs.

The objects sought by such a study are:

(1) To establish standard average costs for unit quarry operation.

(2) To compare costs of various unit steps by differing methods of operation.

(3) To guide efficiency of step operation by comparison of individual costs with standards.

(4) To illustrate the advantages or disadvantages in a contemplated change in operation.

(5) To assist in establishing standardized cost-keeping systems.

An unvarying rule of the bureau is that in publishing total or average figures in reports for general distribution, they must combine data from individual concerns in a way which will leave no chance of exposure of the figures of any one contributor. In its announcement of the study, the bureau stresses this feature so that manufacturers may be assured that their individual costs will be considered entirely confidential.

A standard questionnaire is to be sent out by the Bureau of Mines, to be filled in by the quarry operator. In his letter to cement manufacturers, Mr. Porter says, in part: "The Committee on Conservation, to whom this matter was referred, believes that the proposed data should be of considerable interest and value to the operating men of the cement industry and we therefore suggest that member companies supply as fully as possible the information requested on the questionnaire sent out by the Bureau of Mines."

Workability of Portland Cement Pastes

The study of workability of portland cement pastes has now included tests of three devices—the extrusion cylinder, the ball plasticimeter, and the capillary tube. The first device consists of a cylinder from which a piston forces the cement paste through an orifice, the piston moving at a constant speed.

The three methods have shown differences, in some cases very marked, in the behavior of various cements when tested in the form of neat cement pastes, says the Bureau of Standards, in a recent report on the subject.

Moreover, the relative order of the results is different for each of the three devices. It is apparent that this investigation must be continued to determine the extent to which the test method used influences the results obtained. Without this information no satisfactory comparison can be made of the relative workability of mortars and concretes prepared from these cements. It seems probable that the manner in which a cement is to be used should largely influence the choice of the method by which its workability is determined.

It is interesting to note that the ball plasticimeter and the capillary tube have both placed at opposite extremes of the groups of curves two cements submitted by one manufacturer. One of these cements was considered by the maker as highly plastic when used in concrete and mortars, while the other cement was thought to be of a decidedly opposite character.

"Does Belgium Need the American Cement Market?"

In the March Issue, "Concrete" Published an Article Under the Above Title, Analyzing Belgium's Cement Export Needs—The Following Comment on This Article Appeared in the "Journal of the American-Belgian Chamber of Commerce in Belgium" for April, 1928

By L. P. E. GIFFROY
Director of the American-Belgian Chamber of Commerce

THE fact that the first paragraph of this article mentions "artificial portland cement" and "natural cement," shows plainly that all, or most, of the information of this correspondent was gathered on the Continent, for it is only in Belgium and France that the two denominations are mostly current.

They are equivalent to the American *wet* and *dry* processes.

The sum total of the statistics is therefore fundamentally correct.

Sight must not be lost of the fact that each country (and Belgium is a small country indeed), makes capital of its natural resources.

For instance, the Rocky Mountain states exploit their mining resources, such as gold, silver, copper, etc.

Chile exploits its nitrate.

The Transvaal its diamonds, etc.

And this is as it should be.

No country on earth in comparison to its size is so rich in limestone, chalk quarries, and clay deposits, as Belgium. Hence, being unable to produce on the top soil, sufficient to give its inhabitants a chance to make an honest living, she has to draw from her sub-soil whatever nature has given her in turn.

The South and Central West of the U. S. A. has its immense acreage of top-soil to exploit, not only for the inhabitants' well being, but also for export, of which Belgium is a large purchaser.

Looking at the matter from a strictly economic standpoint, it cannot be denied that Belgium is getting poorer every day, for, no matter how long its sub-soil resources can last, they are fatally getting more scarce every day, as limestone and chalk, no more than other minerals, grow on trees nor can they be planted in the spring, to be harvested in the fall.

This is a struggle for life which future generations will find at the time quite a problem to solve.

For a vast empire like the States, which needs exports of its vast top-soil products to properly feed the millions of its producers and give them the opportunity to constantly increase their wealth, it ill behooves denying the inhabitants of lesser favored nations a chance to make capital—for the time at least, of whatever nature has endowed them with.

The oft-repeated and very much interested howling of the American cement producers that Belgian cement is going to flood the States does not hold good; for as matters progress there are barely enough deposits in sight in Belgium to start two or three more good-sized cement mills, so that it would be materially impossible to produce more for the present, except to the detriment of the production of, say ten or twenty years hence.

Well, *yes,* Belgium needs partly the American markets for her cement, and there is no shame in admitting this, no more than the Southern cotton planter, or the corn and wheat farmer of the West should be ashamed to admit that he needs partly the Belgian market to dispose of his products.

Therefore the sale of Belgian cement pays in an infinitesimal part, for the millions of dollars of top-soil products which she has to buy in the States.

The great economic truth stands out here in its glaring reality.

The Belgian gets poorer every year in natural resources, while the American producer renews his stock every year, therefore getting richer.

On the other hand, as this exchange of commodities is nothing more than the business relations of a community on a larger scale, it implies that if, through some ill-advised policy, the American market could be closed to the Belgian cement (and it means barely one and one-half per cent of the total American output), it would compel the Belgians to secure another outlet, with the natural consequence that the currency of the other country would be exchanged into products of that new market.

In other words, the repetition of the western trading posts in pre-railway days which shifted their locations when the trading firms did not provide their posts with such goods as the Indians and squatters wished to receive in exchange for their pelts and products, as money was of no intrinsic value to them except as a tally of value.

In this, as in every other order of political economy, it is to the interest of all the powers that be, to see to it that the other fellow can secure the wherewithals, in order to exchange or purchase that which one has to dispose of.

Economic wars have always been fought to the detriment of the masses, just as political wars have always been fought for the benefit of a few.

New Production Record for German Cement Industry

Germany set up a new record for cement production during the first quarter of this year. She produced 1,498,000 tons of cement in this period. German cement exports average over 100,000 tons monthly, the Latin-American republics being the chief purchasers. Production continues to rise steadily. The largest proportion of the exports is ferro-portland cement, while the cheaper portland cement and blast-furnace cement both show decreases.

Continue Battle Over North American-Penn-Dixie Merger

Majority of Stockholders Meet in Spite of Restraining Order—Favor Proposed Merger—Minority Group Claim Unfair Exchange of Stock as Reason for Dissension—Bondholders Watch Proceedings

ALTHOUGH minority stockholders are continuing their legal battle to prevent the projected merger of the North American and the Pennsylvania-Dixie Cement corporations, they were unsuccessful in putting a stop to a meeting of majority stockholders on May 2nd. At that time more than 80 per cent of those entitled to vote favored the proposed merger. Eighty-five per cent are necessary to consummate the merger.

A restraining order previously granted failed to halt the meeting. The order prohibited completion of the merger along the lines of the agreement already approved by directors of both corporations.

The corporation had until May 21st in which to file its answer. The minority group might then submit rebuttal until May 24th and on May 25th arguments were to be made before Judge Richard S. Rodney in Wilmington, Delaware, on a motion to halt the merger. The result of that action is not yet known.

Stock Exchange

The dissenting group contends the plan for exchange of the preferred stock in the North American for common stock of the merged corporation at the rate of two for one, is unfair, especially in view of the fact that the present common stockholders are enabled to exchange their holdings for common in the new corporation at the rate of two shares of the present stock for one-half share of the new stock.

Under the terms of the merger agreement, the preferred shares of North American Cement, with a par value of $100, are to be exchanged for two shares of common in the new corporation having no par value and a market value of less than $25 per share. No par value common stock of the present company would be exchangeable at the rate of one share for a half share of new common.

It is this ratio of exchange that is denounced by the minority group of preferred shareholders, who have no real objection to the merger itself, but believe that the North American is in a strong position and able to operate profitably alone.

Bondholders' Viewpoint

Bondholders are taking no part in the battle against the probable merger, although they are said to be reluctant to exchange their debentures for preferred stock in the merged corporation as is provided for in the merger agreement.

New Asano Cement Plant for Japan

President Soichiro Asano of the Asano Cement Company of Japan, recently spent some time in Kyushu, Japan, for the purpose of investigating personally prospective sites for the new cement mill which is to be built for manufacturing cement there. This mill is part of the plans of the Asano Super High Grade Cement Company, which was recently taken over by the parent firm.

The most probable location of the new mill, however, will be in Kokura City, near the harbor, which is most convenient for the receipt of raw materials and shipping of the finished product. The capacity of the new mill will be little less than that of the company's Moji mill, which has a capacity of 1,000,000 barrels annually. Construction is to follow immediately upon the selection of a definite site.

New Books

Ethics and Policies

TRADE ETHICS AND MARKETING POLICIES. Published by the International Cement Corporation, New York, and its subsidiaries.

A complete statement of the trade ethics and marketing policies under which Lone Star cement is sold are contained in this 38-page booklet. The distinction is drawn between dealers and so-called distributors, under the title "Lone Star Dealer Policy."

Then follows a clear and concise outline of merchandising policies including such subjects as: combination dealer, new dealers, prices, trade discounts, terms, quotations, contracts, shipments, sacks, routing, bin tests, etc.

The second section under the title "Cement Prices" is an explanation of the factors and conditions which control the price policy.

The last section of the book is devoted to the explanation of the reasons which have prompted the formulation and adherence to this dealer policy, and trade ethics.

"Cement in 1926"

CEMENT IN 1926. Published by the Bureau of Mines, Department of Commerce.

A general review summarizes 1926 production and shipments. A 2 per cent increase in production is noted in 1926 over 1925, the previous record year. A list of hydraulic cement plants, arranged alphabetically by states, is then given.

Tabulations of figures include production, shipments and stocks by states, by months and districts, and a third summarizes monthly estimates of clinker production and stocks.

Then follow in the order given remarks and statistics on domestic consumption, prices, imports and exports, and cement production in Canada.

Calcination of Clay-Limestone Mixes

Stages in the Calcination of a Clay-Limestone Mix

Up to 100° C.—Hygroscopic moisture is driven off.
450 to 550° C.—Water of hydration is driven off.
730 to 750° C.—Decomposition of limestone sets in with consequent formation of lime and of silicates, aluminates and ferrates of calcium.
750 to 895° C.—Decomposition of limestone and reaction of lime and calcium carbonate with silica and oxides of alumina and iron.
895 to 905° C.—Rapid and complete disintegration of limestone.
905 to 1020° C.—Continuous reaction of lime and oxides mentioned with silicates, aluminates and ferrates of calcium of low basicity, with consequent formation of compounds with high calcium content.

By DR. E. MONATH

As the various reactions which are produced in a clay-limestone mix during the first stage of calcination have not as yet been well defined (temperatures up to 1000 deg. C.), the author has attempted to follow these changes at temperatures varying within the indicated range. It was not his purpose to determine variations of the chemical composition, as these are linear functions, but of the content of hygroscopic moisture, water of hydration and carbon dioxide (the two latter being included in "loss on ignition), insoluble residue and free lime. The results obtained have permitted drawing interesting conclusions on the phenomena which take place during calcination of such a mix.

Method of Procedure

1. ***Materials.*** To obtain results of definite value the author had to use materials possessing perfect aptitude to calcination. Such materials were found in the marl from the Kastel-Sucurac (Spalato) quarry, which is exceptionally homogeneous and yields to calcination (the insoluble residue becomes reduced to nearly 0 at temperatures no higher than 1000 deg. C.). Its granulometric composition, of great regularity and fineness, is illustrated in Figure 1. The pulverized and thoroughly mixed material used had the following chemical composition:

	Per cent	On the basis of calcined material Per cent
Hygroscopic humidity (by heating to 105 deg. C.)	1.10	------
Loss on ignition (by heating from 105 to 1000 deg. C.)	36.40	------
Silica (SiO_2)	13.32	21.30
Alumina (Al_2O_3)	3.98	6.38
Iron oxide (Fe_2O_3)	1.90	3.04
Lime (CaO)	41.65	66.60
Magnesia (MgO)	1.29	2.06
Sulfuric anhydride (SO_3)	0.25	0.40
Alkalis and loss	0.11	0.22
	100.00	100.00
Insoluble residue	9.8	15.7
Free lime	0.0	------

2. ***Heating.*** A small electric carbosilicon resistance furnace was used for calcination. The temperature was regulated by a rheostat connected in series and was measured, for lack of other means, by Seger cones placed near the crucibles containing the mix. For temperatures below 900 deg. C. various salts and metals were also used, their familiar points of fusion permitting determination of the intervals of temperature. For temperatures below 350 deg. C. a mercury thermometer was used, while heating up to

RESULTS OF THE ANALYSIS

Temperature reached, degrees:	45	105	250	450	500	550	620	675	730	750
Moisture, per cent	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loss on ignition, per cent	36.4	36.7	36.7	36.0	35.2	34.5	34.5	34.5	34.5	31.7
Insoluble residue, per cent	9.8	9.9	9.9	10.0	10.1	10.1	10.1	10.1	10.1	8.7
Free lime, per cent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.8

Temperature reached, degrees:	775	800	860	895	900	920	940	980	1000	1020
Moisture, per cent	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Loss on ignition, per cent	30.5	28.2	20.2	11.1	1.5	0.0	0.0	0.0	0.0	0.0
Insoluble residue, per cent	5.2	4.7	2.8	2.9	3.1	2.9	2.5	0.9	0.3	0.1
Free lime, per cent	1.4	1.6	9.8	24.7	30.4	31.6	30.9	24.5	20.7	18.2

Translated from Revue des Materiaux de Construction et de Travaux Publics, March, 1928.

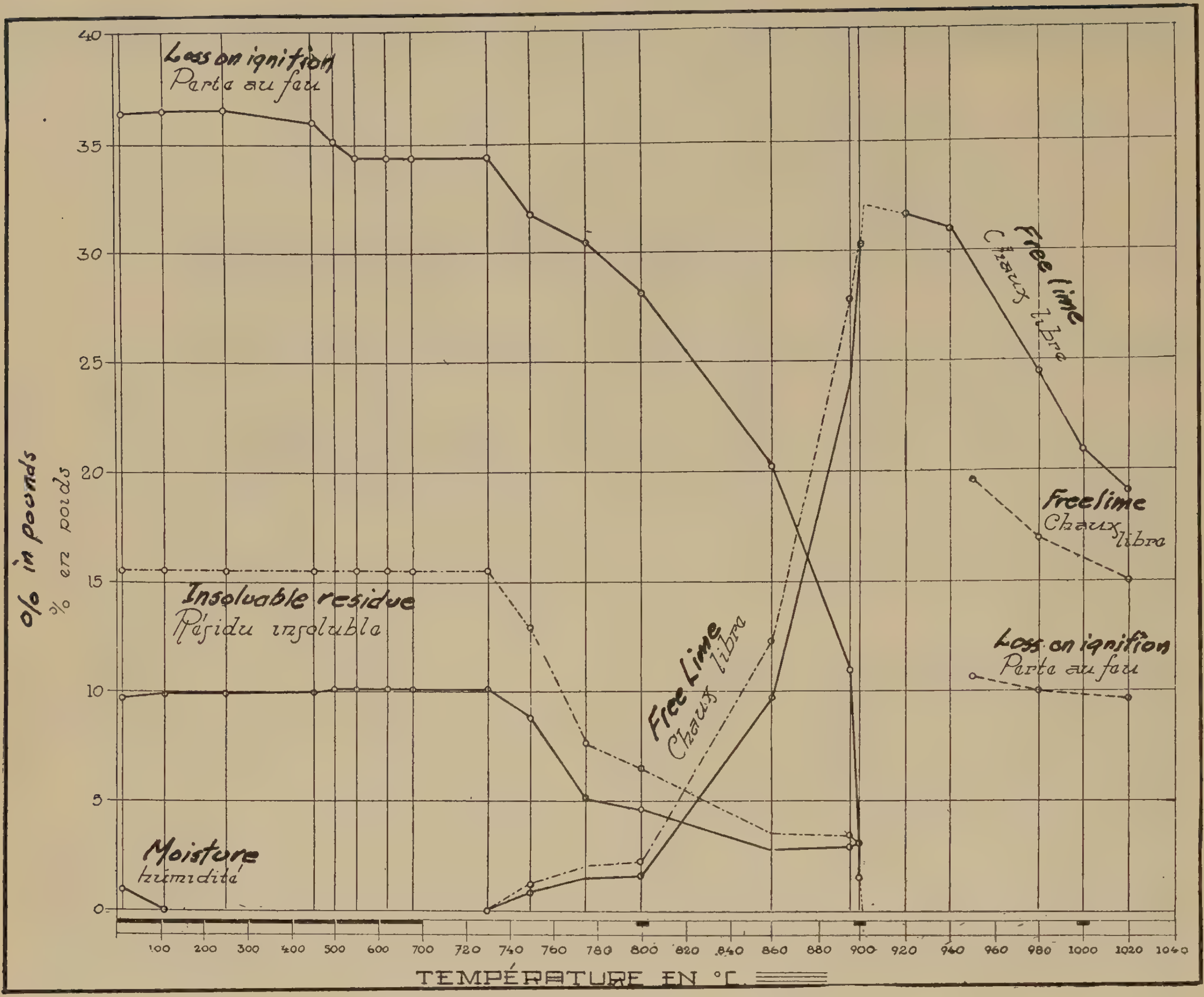


Figure 1

250 deg. C. was effected in an electric air furnace of a familiar type.

Calcination of the limestone-clay mix took place as follows: The pulverized mix was introduced into a platinum crucible and was placed in the furnace. Seger cones were placed near the crucible for temperature measurements and an electric current was made to pass. In about one hour the desired temperature was reached. It was determined approximately by the position of the pointer of the rheostat or, more exactly, by the method described above. This temperature was maintained for 6 hours. The crucible was then removed and the material reduced to a very fine powder and placed in a dessicator. In repeating this operation little variation in temperatures was observed.

It must be mentioned here that this method does not permit the determination of a state of equilibrium at different temperatures; however, the author's purpose was to reproduce as far as possible the commercial calcination of cement. The values thus obtained group themselves into regular series, which goes to prove that this method furnishes valuable indications for practical conditions.

3. Chemical analysis. Insoluble residue. The usual method was used in boiling in a 10 per cent solution of sodium carbonate the washed residue remaining insoluble after the treatment with hydrochloric acid and water of the substance previously treated with concentrated hydrochloric acid (10 cc. per ½ gm. of substance) and heated to constant weight. The part remaining insoluble in sodium carbonate is termed the "insoluble."

Free lime. The methods used for the determination of free lime in cements, slags, clinkers, etc., make no pretense to being very exact. Nevertheless, White's qualitative method (Ind. and Eng. Chem., 1, 5, 1909) and Emley's quantitative method (Trans. Am. Ceram. Soc., 17, 720 1915), which is not new but has been recently brought to light again by Lerch and Bogue (Ind. and Eng. Chem., 18, 739, 1926), have seemed to be sufficiently accurate for purposes calling for a determination of free lime.

The second method was checked by Diepschlag and Mattig (Centr. d. Hutten-u. Walzwerke, 31, p. 366, 377 and 394, 1927) and by the present author. In examining portland cement clinker, well calcined, and in making mixtures with underburned clinker and free lime, the author became convinced of the value of the two methods. A description of the method of procedure may be of interest in this connection.

White's Method of Determining Free Lime

White's method produces a reaction between phenol and the free lime, which results in the formation of characteristic needle-shaped crystals of calcium phenolate. The material to be examined, kept out of contact with air, is finely pulverized and a small quantity of it is placed on a glass plate. A few drops of the reagent (10 gm. phenol, 10 gm. nitrobenzol, 0.1 gm. water) are added and microscopic observations are made in polarized light with crossed nicols to detect the formation of brilliant needles. The latter is a sure indication of the presence of free lime. However, the phenol and nitrobenzol used, should be distilled and crystallized recently due to high hygroscopicity of these two substances and they should be kept in hermetically sealed containers.

If the lime content is high, needles are formed in a few minutes and can be easily recognized. However, when the sample contains but little free lime (2 to 4 per cent), the formation of the needles proceeds slowly during the first hours of the reaction and they may be confused at first with other constituents of the substance, which also appear brilliant in polarized light with crossed nicols. In such cases it is better not to limit oneself to low magnification, but to use up to 400 diameters, for then no doubt will be entertained as to the presence of lime. At times it may be useful to check the presence of the needles with parallel nicols. In any case the needles can be recognized without difficulty after 10 to 20 hours.

The formation of phenolate needles takes place as follows: The edges of a particle begin to turn luminous. Then the particle becomes surrounded by small needles, which grow and produce a star-like grouping around a central point. In growing, these needles sometimes become detached from their origin. When the free lime content is very low (less than ½ per cent) the formation of needles does not take place, but a white spot is detected with crossed nicols, which is due to calcium phenolate. It is probable that in time it will be possible to observe the formation of these crystals with common magnification, providing the action of the reagent does not cease due to its volatile nature. Nothing unusual is noted with parallel nicols in this case, which is a peculiar characteristic. With a little practice, this method becomes very useful and permits the approximate determination of the quantity of free lime present by the number of needles and the time required for their formation.

Emley's Method of Determining Free Lime

Emley's method consists in producing a reaction with the application of heat between the lime and an ammonium salt. Ammonia is driven off during the reaction and neutralization of the lime by the acid of the ammonium salt is the result. The presence of water should be carefully avoided, as it would produce hydrolysis of a good many of the calcium compounds and tend to form free lime. Because of this, one proceeds with a solution of absolute alcohol and glycerine (the latter dissolves the lime). A solution of about 0.2n ammonium acetate is prepared by dissolving 16 gm. dry ammonium acetate in 1 liter of absolute alcohol and determining the titre with chemically pure lime.

One proceeds as follows with titration and determination of the free lime: According to whether the sample is supposed to have a high or low content of free lime, 0.1 to 1 gm. of the finely pulverized material is weighed and placed into a balloon flask, adding 25 cc. absolute alcohol and 5 cc. very pure and anhydrous glycerine. The mixture is heated, taking care to cover the flask when allowing it to cool. Boiling is maintained for several minutes, whereupon the sample is titrated with a solution of ammonium acetate (indicator: a few drops of phenolphthalein) until the red color disappears. It is heated again until the color reappears and titration is continued by repeating this operation until the color no longer reappears.

In spite of the insoluble matter contained in the liquid (only the lime becomes dissolved), the change of color is very sharp by daylight, so that with a little practice, titration presents no difficulties even in artificial light.

Proceeding in accordance with this description, the free magnesia is not determined. This is of minor importance, as the materials selected for these investigations contained a very low quantity of magnesia. As described above, the method was very well adapted to the materials used. When the material is very hard and contains little free lime, it may be left standing in a mixture of alcohol and glycerine for 24 hours before beginning the titration, so that all of the free lime is dissolved. This is recommended by Diepschlag and Mattig.

Moisture. The loss of weight of the sample is determined by heating to 105 deg. C. in a hot air oven. In this way all hygroscopic water is evaporated, while the water of hydration of the clay is comprised in "loss on ignition."

Loss on ignition. One gm. of the substance, previously dried to 105 deg. C. in an oven, is kept for several hours at a temperature of 1000 deg. C. and the loss of weight is determined. At this temperature all of the carbon dioxide and water is driven off from the clay-limestone mix, as determined by the author by means of a complete analysis of a mix calcined in this manner.

The results are platted in Figure 1. The curves show the variations of moisture, loss on ignition, insoluble residue and free lime in per cent. Figure 2 illustrates the state of lime in mixes heated to different temperatures (calcium carbonate, free lime and lime compounds of SiO_2, Al_2O_3 and Fe_2O_3). The calcium carbonate content is determined by loss on ignition. No account is taken of magnesia.

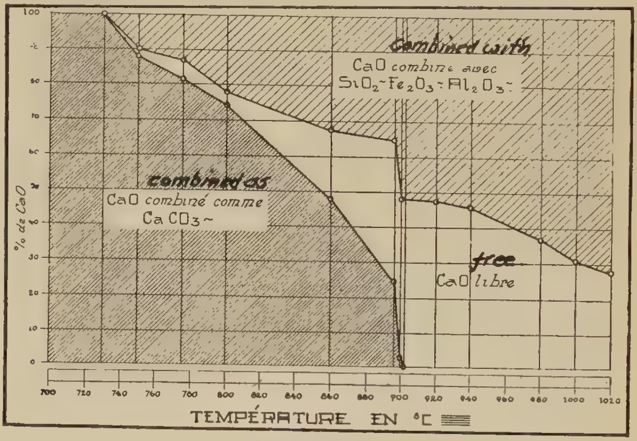


Figure 2

Conclusions

The investigations reveal the following stages in the calcination of a clay-limestone mix:

Up to 100 deg. C.: Hygroscopic moisture is driven off.

450 to 550 deg. C.: Water of hydration of clay is driven off.

730 to 750 deg. C.: Decomposition of limestone sets in with consequent formation of lime and (as clay is already decomposed) of silicates, aluminates and ferrates of calcium.

750 to 895 deg. C.: Decomposition of limestone and reaction of lime and calcium carbonate with silica and oxides of aluminum and iron.

895 to 905 deg. C.: Rapid and complete decomposition of the limestone.

905 to 1020 deg. C.: Continuous reaction of lime and oxides mentioned above (as long as they have not yet combined to form calcium salts) with silicates, aluminates and ferrates of calcium of low basicity, with consequent formation of compounds with high calcium content.

These results have already been indicated in a general way by Bied (C. R. Seance of May 23, 1914, Association Intern. pour l'Essai des Materiaux, Paris) and Dyckerhoff (Zement, No. 14, p. 200, 1925) by cooling curves, whose confirmation is of interest. It must be mentioned, however, that a large part of the calcium carbonate becomes decomposed below 900 deg. C. The cooling curves indicate but little in this connection, for the thermal effect of the formation of silicates, etc., from calcium carbonate and silica cannot be very strong.

The decomposition of calcium carbonate into lime and carbon dioxide is an endothermic reaction, while the reaction of lime with the oxides is exothermic. The resulting reaction thus has for its thermal effect the difference between the two quantities of heat developed in the two simple reactions. At any rate it is the author's opinion that the decomposition of a limestone-clay mix is more easily accomplished than that of pure calcium carbonate and that in the former case a true reaction of the following type (as far as silica is concerned) is produced:

$$CaCO_3 + SiO_2 = CaSiO_3 + CO_2$$

This results in a rapid diminution of the loss on ignition and of the insoluble residue above 750 deg. C., as well as in a slow increase of free lime. The decrease in insoluble residue is not due to the decomposition of the clay, for, as the author had occasion to observe, the insoluble residue of a clay almost entirely free from lime decreases in but an insignificant manner upon calcination.

At the same time there takes place the decomposition—so well known—of calcium carbonate into calcium oxide and carbon dioxide (the equilibrium pressure of the system $CaCO_3.CaO.CO_2$ is equal to 50 mm. at 700 deg. C.). The working conditions adopted (reproducing those of an industrial cement kiln) did not permit reaching a perfect equilibrium. An increase in temperature results in an increase of pressure of dissociation of calcium carbonate. At about 900 deg. C. this pressure reaches atmospheric pressure. At this temperature all of the calcium carbonate becomes decomposed, the prevalent simple reaction of decomposition being:

$$CaCO_3 + CaO + CO_2$$

which takes place from left to right until all of the calcium carbonate is used up.

Effect of Fine Grinding

Naturally all that is said here applies to all clay-limestone mixes suitable for calcination of portland cement qualitatively and not quantitatively. The phenomena vary obviously with the thoroughness of distribution and the fineness of the mix. The mix used here was exceptionally homogeneous, and this was probably the reason for its high aptitude to calcination (co-efficient of calcination).

It would be of interest to carry on the researches above 1020 deg. C. It is probable that the decrease in free lime continues regularly until it disappears completely or up to the formation of the most strongly basic compounds obtainable with the materials in question, providing they yield themselves to calcination. At higher temperatures the phenomena become more complex; a number of liquid phases and an indeterminate number of solid phases is the result.

It is very difficult to determine the composition of the various constituents which are formed during calcination of cement and the author was not able to obtain any indication of these.

An indirect confirmation of the continuous decrease in free lime with increasing temperature was obtained by examining four clinkers produced under the same conditions and from the same materials. The following results were obtained:

1. Raw material.
2. Uncalcined.
3. Underburned clinker.
4. Good clinker.

	1	2	3	4
Moisture, per cent	1.10	1.16	0.57	0.35
Loss on ignition, per cent	36.40	7.40	3.08	1.63
Insoluble residue, per cent	9.8	0.16	0.22	0.0
Free lime, per cent	0.0	11.25	3.40	trace

As mentioned above, the determinations (except for those of clinker) were carried out on samples kept in tightly sealed containers after heating. If this precaution is not followed, rapid carbonization of the lime occurs. The curves indicated by dash lines (- - - -) in Figure 1 show the results obtained on samples kept in containers closed only by a glass lid. In observing the values for industrial clinkers, it is noted that the curves lie beyond the field examined by the author, which goes to prove that the phenomena taking place in an industrial kiln do not differ substantially from those produced on a small scale in the laboratory.

Economic Studies of Nonmetallic Minerals Made

The work of the Rare Metals and Non-Metals Division in the economics branch of the United States Bureau of Mines, Department of Commerce, is to be expanded by increasing its activities in the nonmetallic minerals. A special section having to do chiefly with the structural nonmetallics, such as stone, cement, brick and tile, sand and gravel, lime and gypsum, is being organized. Oliver Bowle, formerly supervising engineer of the Nonmetallic Minerals Experiment Station, at New Brunswick, New Jersey, has been placed in charge of this section with J. R. Thoenen, mining engineer of the New Brunswick Station, as assistant. The work will be centered in Washington, D. C.

The structural nonmetallics and their primary products have a total annual production value in the United States of approximately one billion dollars. Intensive study will be directed toward such problems as systematized cost keeping, distribution of products, transportation, a better knowledge of markets, market requirements, extension of uses, and similar features.

Signal Mountain Merger Likely in Near Future

It is likely that a consolidation involving the Signal Mountain Portland Cement Corporation will take place shortly. However, those in intimate touch with company affairs say that no change in ownership is imminent. They admit, though, that under certain conditions a consolidation would be desirable and that ultimately this may be done.

The other interested party is not named.

EDITORIAL

Why All the Whispering?

IT is well known that a considerable number of American cement plants are now turning out high early strength portland cements. But for some reason or other, the industry doesn't seem ready to accept that fact. Nearly every producer of such cement seems to believe that the whole thing remains an immense secret, and that he alone, or he and a few of his friends, are the only people in the country who know just how such cement can be made.

All of which is largely nonsense. There are very few cement manufacturers who have not made experiments in their own plants and laboratories and who do not know, at least in a general way, how these newer cements are made. There are, of course, operating problems in connection with their production that will need to be ironed out, but even here, progressive equipment manufacturers are ready to help.

Such being the case, it is logical to feel that a free exchange of information on the subject would be to the best interest of all concerned. As it has been in the past, anything that increases the manufacturing efficiency of the industry in general, will increase sales for all.

The advent of improved portland cement, like any other new thing, is apt to be accompanied by inconveniences and even hardship to some manufacturers. But just when the cement industry is beginning to learn that the manufacture of ordinary cement is no secret, it seems particularly unfortunate that the industry should again saddle itself with the burden of outgrown individualism. It only adds an unnecessary increment to the inevitable cost of change.

A Protective Tariff for Cement

THE newspaper battle for and against a protective tariff for cement continues to be waged. Here we see an article pointing out why a protective tariff is needed, here is a story pointing out how a state saved thousands of dollars by buying foreign cement and here is a newspaper editorial that dogmatically sums up the subject in the caption "All Graft."

We read that one state saved $45,000 by buying Belgian cement for its highway program and in another state the claim is made that a reduction of 60 to 75 cents per barrel on cement for state highways has been secured through the purchase of foreign cement.

The editorial referred to above says, in part, "If one cent per barrel were added to the price of cement, it would buy all the imported cement. There is no tariff on cement. It is made of rock and the labor cost is almost nothing. The difference on freight alone on foreign cement is a sufficient tariff, so that any duty levied would be pure graft and corruption."

Looks like a bad case for the cement industry, doesn't it? Yet, when we examine all the facts in the case, there is another story to be told. And this story *is* being told in a clear, statistical, logical manner. It points out what—in dollars and cents—the importation of foreign cements means in loss to American industry. It shows how the prosperity of the cement industry in the United States is influential in the stimulation of American business and how money that goes out of the United States loses all force as a stimulant of domestic business.

It is encouraging that this question is being debated in the public press. The question is being brought before buyers of cement and other business men and they are being encouraged to think about it. More publicity is needed. Few men outside the cement industry or related industries know that the manufacture of cement is a process that involves large pay rolls, huge investments in equipment and supplies, all of which have a direct effect on our general prosperity.

A tariff on cement cannot be secured by presidential action under the provisions of the flexible tariff section of existing law. The provision which permits the president to raise or lower existing duties is restricted to articles already on the dutiable list. Articles such as cement, which are now on the free list, are expressly exempted. Only Congress can place a protective tariff on imported cement.

When it is known more generally that a protective tariff on cement will have a beneficial effect on business in general and that all classes who directly or indirectly render services to those in the cement industry or related industries will be affected favorably, then a protective tariff will be more readily secured.

Service as a Sales Aid

SERVICE departments in the cement manufacturer's organization are becoming of increasing importance. Those well organized service departments that have been in existence for some time find the volume of their work increasing and cement manufacturers who have not had service engineers are adding them to their pay rolls.

The service department is in reality a part of the sales department. It functions when technical matters come up in connection with sales work. It is of great value in building good will and in handling complaints, especially when the sales department is not composed of technically trained men.

Riverside Reorganizes; Special and Regular Dividends Declared

Reorganization of the Riverside Portland Cement Company has been announced in a letter to the stockholders. The California organization will be reincorporated under a Delaware charter and will have authorized 70,000 shares first preferred, 240,000 of the class A common and 400,000 of the class B common.

The present stockholders of the California corporation will receive one share of preferred stock and four each of the class A and class B common for each share now held.

The directors declared the regular monthly dividend of 50 cents per share on April 30th to stock on record April 15th, and special dividend No. 16 of $1.50 to stock of record April 25th.

New England's Second Cement Plant Proposed

With the objective of completing its 1,150,000-barrel cement plant by the first of October, the Commonwealth Portland Cement Company has been organized at Pownal, Vermont, by Leonard L. Griffiths of Ann Arbor, Michigan.

A tract of land near formerly worked lime deposits has been purchased and long term options are held on adjoining property, totaling in all 267 acres. The property is situated advantageously on the Boston and Maine Railroad.

Bids are soon to be received from contractors on the construction of mill buildings and orders for machinery and equipment costing $780,000 have been placed with the Kennedy-Van Saun Manufacturing and Engineering Corporation.

Faxon Bowen of North Adams, Mass., is credited with having drawn attention to the heavy deposits of raw materials at Pownal, and it was through his efforts that Mr. Griffiths became interested.

A bond issue is being floated by the New York house of Don Leven & Company, Inc.

Mr. Griffiths, who will head the organization, has been interested in the cement industry for twenty-two years, in which time he has been connected with eight cement companies. He was most recently head of the Michigan State Cement Industries.

Oliver C. Brooks of Philadelphia, Pa., a consulting engineer also lately associated with the Industries, is to be vice-president and superintendent. John T. McGovern, New York attorney, is to act at secretary. These men, with John F. Burke of Boston, S. John Connolly of Boston, and D. Pennebacker of Allentown, Pennsylvania, are named as directors of the corporation.

Work Begun on First Unit of Sandersville Plant

Another cement plant will be added before long to the growing list of those manufacturing quick-hardening cement. Construction work is about to begin, as scheduled, on the Georgia Portland Cement Corporation plant south of Sandersville, Georgia. The second unit of the $2,000,000 plant will be erected in 1929.

The Sandersville Railroad has begun work on a mile of sidetrack, having a capacity of 50 cars.

Approximately 300 persons will be employed and the completion of the mill is awaited eagerly locally.

Great Lakes Distribution Center at Cleveland

Clinker to Be Finish Ground on Boats En Route to Storage Tanks at Cleveland; Plant to Be Erected in 1929

The Great Lakes Portland Cement Company will have a battery of twelve storage tanks in Cleveland, Ohio, receiving their supply by boat from Buffalo, if its present plants are realized. What is more, cement will be ground on the ships en route. Great Lakes plans also to supply the demand for ready-mixed concrete by mixing at the point of storage and delivering by truck. Also, some time shortly after 1928, about two million dollars will be spent on the construction of a portland cement manufacturing plant at Cleveland.

The company has acquired a site near the Erie railroad and south of the Cuyahoga river.

The local Van Sweringen interests have been consulted in making arrangements for the plant in Cuyahoga Valley and it is likely that its location will be taken advantage of by these interests in an immense terminal development planned for Cleveland.

The Great Lakes Portland Cement Company is affiliated with the Lehigh Portland Cement Company.

Marquette Adding Buildings and Equipment at Oglesby Plant

The Marquette Cement Manufacturing Company has under way at its Oglesby, Illinois, plant the construction of an addition to its raw materials department and the installation of kilns, crushers and silos.

Four of the latest type grinding mills will replace the present rather obsolete equipment. Other machinery to be installed in that department includes large jaw crushers, hammer mills, new rock dryers, and compartment mills.

In the burning end, two new kilns, grinding mills, crushers and silos will be installed.

The new building, covering an area of 200 by 300 feet, will be located south of the present raw end plant. It is expected to be ready for operation by the first of 1929.

A high degree of dustlessness will be sought and a goodly amount of money expended toward attaining that end.

Peerless Takes Control of Former Egyptian Company

Control of the Peerless Egyptian Cement Company passed into new hands following the annual meeting at Port Huron, Michigan, held recently. The former Egyptian Portland Cement Company was merged recently with the Peerless interests.

Directors elected are: R. D. Baker, Birmingham, Mich.; L. A. Beeghly, Youngstown, Ohio; William M. Hatch, Detroit; A. J. Henning, Chicago, Ill.; S. R. Livingston, Detroit; R. T. McKenna, Washington, D. C.; E. A. Peck, Chicago, Ill.; Charles Schmutz, Youngstown, Ohio, and C. C. Peck, Port Huron, Mich., formerly chairman of the board of the New Egyptian company.

At the first meeting of the newly elected board of directors the following officers were elected: L. A. Beeghly, chairman of the board; William M. Hatch, president; Charles Schmutz, vice-president; S. R. Livingstone, secretary, and Calvin Baker, treasurer.

MEN and MILLS

Notes from the Field

Northern Wyoming Plant Proposed

Although indefinite, reports are current that Chicago capital has been secured for the construction and operation of a cement plant for Wyoming. The Monolith Midwest Portland Cement Company is now completing its plant at Laramie, in the southeast corner of the state.

The state geologist, John Marzel, has pointed out that the newer venture should not be near the Monolith location and that there are numerous advantageous sites near either Thermopolis or Greybull, in territory which would warrant a plant.

The former town, according to the geologist, is on the southern boundary of an extremely rich basin area. The town of Greybull is on the Big Horn River and also has easily accessible deposits.

Marquette Reported to Be Considering Indiana Plant

The owner of some of the land involved is credited with having given circulation to the rumor that the Marquette Cement Manufacturing Company is to build a plant near Gosport, Indiana, some distance southwest of Indianapolis.

According to the local press, Judge J. C. McNutt. owner of a farm north of the town, "believes the cement manufacturing industry in this immediate section will be developed within the next few years, and he volunteers to assist materially in bringing about such development."

It is said that five or six years ago Marquette core drilled in the territory, with satisfactory findings of limestone. No shale was found in the locality. Options were secured but these were allowed to expire.

Robert W. Lesley Tells of Beginning of Cement in America

Chosen as an authority on the industry and manufacture of cement, Robert W. Lesley of Philadelphia, Pennsylvania, recently addressed the Allentown (Pa.) Kiwanis Club.

He told how he had seen the industry grow from 5,000 barrels a year in 1874 to 170 million barrels yearly and of its original development in a Pennsylvania county.

Volunteer Begins Production; Orders Plentiful

Eight hundred barrels of cement were turned out by the new Volunteer Portland Cement Company plant at Knoxville, Tennessee, on May 14th. There were several bidders for the first barrel of cement produced and enough orders have been booked to absorb the capacity production, whenever it may be reached, according to Charles Lewis, general manager.

The first cement was shipped about a week after initial production began. No more than 120 employees will be required to effect the production of 3000 barrels daily.

Wharfboat Purchased by Wellston Company

The Wellston Iron Furnace Company will establish a barge line between Ironton and Cincinnati to transport its cement from the plant at Superior, Ohio, to Cincinnati.

A wharfboat has been purchased and will be moored for a storage plant. The company will construct a concrete grade leading to the wharfboat.

Sandusky Removes Offices to Chicago

The need of a Chicago sales department necessitated the recent removal of the general sales offices of the Sandusky Cement Company from Dixon, Illinois, to the larger city.

All employees in the Dixon office accompanied Sales Manager L. E. DeCamp to the new office at 228 North LaSalle Street.

Oaks New Superintendent at Indiana

J. J. Oaks, formerly in charge of the International Cement Corporation plants in South America, has been selected as superintendent of the Indiana Portland Cement Company at Greencastle.

Old Cement Plant Acts as Auxiliary

The Colorado Portland Cement Company's mill near Red Buttes, Wyoming, had apparently been abandoned, but it is now active in the crushing of rock for shipment to the company's new cement plant at Fort Collins, Colorado.

Morgan, Manager of Texas Subsidiary, Resigns

E. S. Morgan, of Dallas, Texas, vice-president and general manager of the Texas Portland Cement Company, has resigned his position. He will be succeeded by L. R. Ferguson of New York.

Mr. Morgan's connection with the firm began about twelve years ago when he joined the International Cement Corporation, of which the Texas company is a subsidiary. He assumed his position in Dallas after having served the firm for six years in Argentina.

Mr. Ferguson has been associated with International for some time. He will be accompanied to Texas by H. C. Koch, a vice-president of International.

Penn-Dixie Will Change Address Next Year

In about April, 1929, the Pennsylvania-Dixie Cement Corporation will remove its New York offices from their present location at 131 E. 46th Street to Fifth Avenue and 43rd Street. The building will be completed about that time.

Oklahoma Makes Reduction in Price to City

A reduction of 6 cents a barrel in the price of cement was offered Oklahoma City, Oklahoma, by the Oklahoma Portland Cement Company, following a demand on the part of the city for a reduction.

Abandonment of the Iola, Kansas, freight rate for shipments of cement to Oklahoma City was agreed to by the company. Oklahoma City will be charged only the rate from Ada, where the company operates a plant in addition to the one at Iola.

Although the reduction was not as much as was sought, the city is reported to be satisfied.

Lehigh Indiana Mill Goes to Work with New Equipment

Having again resumed operation in full speed, the Lehigh mill at Mitchell, Ind., early in May, will exert every effort to produce the 6000 barrels of cement expected per day.

New machinery was recently installed extensively and a higher production record is sought as a consequence.

Cement Statistics for April

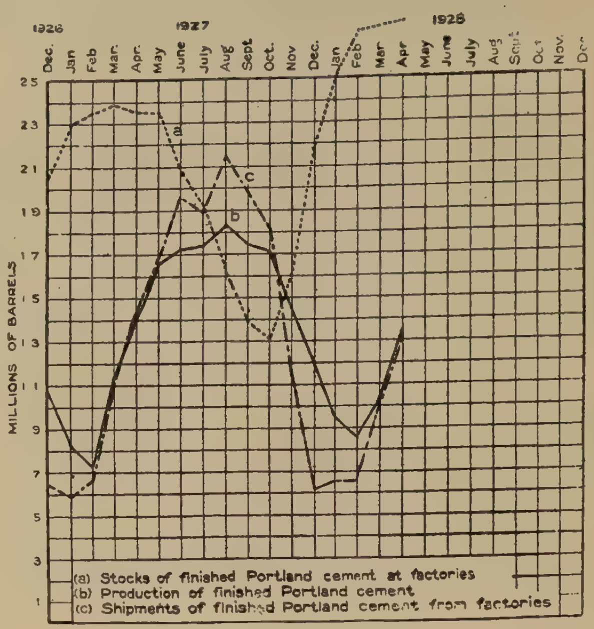
RECORDS of the portland cement industry for April show more favorable conditions than those for March. The relation of production to capacity increased from 51.7 per cent in March to 70.0 per cent in April. Shipments for April were 13,307,000 barrels, an increase of more than 3,000,000 barrels over the previous month, though they were still 7.3 per cent below the shipments for the same month last year.

Production of portland cement for April showed an increase of some 3,000,000 barrels over March, though here, also, the volume is lower by 4.1 per cent than for the same month last year.

The statistics of the U. S. Bureau of Mines from which these records are taken, includes this month the output of a new mill—the Thomaston, Maine, plant of the Lawrence Portland Cement Co., which went into production during April.

Relation of Production to Capacity

	April 1928	April 1927	March 1928	Feb. 1928	Jan. 1928
	Per cent	Per cent	Per cent	Per cent	Per cent
The month	70.0	78.1	51.7	47.5	49.4
The 12 months ended	74.0	76.3	74.6	75.1	74.5



Production, Shipments and Stocks of Finished Portland Cement, by Months and by Districts, 1927 and 1928, and Stocks in March, 1928

Month	Production 1927	Production 1928	Shipments 1927	Shipments 1928	Stocks at end of month 1927	Stocks at end of month 1928
January	8,258,000	*9,768,000	5,968,000	*6,541,000	22,914,000	25,116,000
February	7,377,000	8,797,000	6,731,000	6,563,000	23,563,000	27,349,000
March	11,450,000	10,223,000	11,100,000	10,135,000	23,922,000	*27,445,000
April	14,048,000	13,468,000	14,350,000	13,307,000	23,654,000	27,605,000
May	16,701,000		16,865,000		23,503,000	
June	17,224,000		19,761,000		20,972,000	
July	17,408,000		18,984,000		19,397,000	
August	18,315,000		21,411,000		16,292,000	
September	17,505,000		19,828,000		13,996,000	
October	17,174,000		18,105,000		13,141,000	
November	14,449,000		11,619,000		16,022,000	
December	11,999,000		6,200,000		*21,924,000	
	171,908,000		170,922,000			

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*Revised.

District	Production—April 1927	Production—April 1928	Shipments—April 1927	Shipments—April 1928	Stocks at end of April 1927	Stocks at end of April 1928	Stocks at end of March, 1928*
Eastern Pennsylvania, New Jersey, Md.	3,640,000	3,084,000	4,163,000	3,303,000	5,154,000	6,463,000	6,682,000
New York and Maine†	898,000	831,000	843,000	850,000	1,624,000	1,847,000	1,866,000
Ohio, Western Penn., and West Virginia	1,409,000	1,321,000	1,301,000	1,154,000	3,380,000	3,577,000	3,411,000
Michigan	1,056,000	1,056,000	963,000	846,000	2,068,000	2,470,000	2,260,000
Wisconsin, Illinois, Indiana, and Kentucky	1,552,000	1,438,000	1,623,000	1,670,000	3,277,000	3,429,000	3,661,000
Virginia, Tenn., Ala., Ga., Fla., and La.	1,354,000	1,381,000	1,385,000	1,276,000	1,144,000	2,040,000	1,935,000
Eastern Missouri, Iowa, Minn., and So. Dak.	982,000	1,142,000	977,000	1,154,000	3,231,000	3,901,000	3,912,000
Western Missouri, Nebraska, Kansas, Okla.	964,000	906,000	791,000	803,000	1,756,000	1,566,000	1,463,000
Texas	469,000	557,000	491,000	538,000	425,000	468,000	450,000
Colorado, Montana, and Utah	210,000	200,000	194,000	217,000	486,000	465,000	482,000
California	1,177,000	1,254,000	1,263,000	1,184,000	629,000	929,000	860,000
Oregon and Washington	337,000	298,000	356,000	312,000	480,000	450,000	463,000
	14,048,000	13,468,000	14,350,000	13,307,000	23,654,000	27,605,000	27,445,000

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*Revised. †Maine began producing and shipping in April, 1928.

Mill Equipment

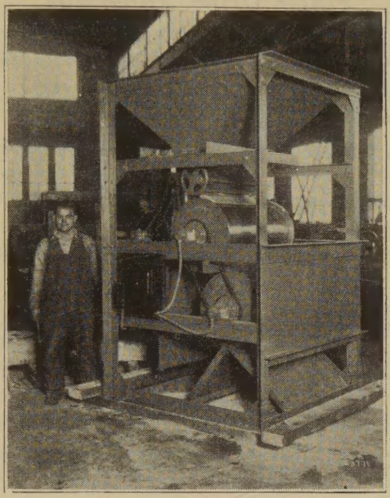
"High Duty" Type Magnetic Separator Built

To meet the request of the Superior Portland Cement Company in Ohio for a means of controlling the variable iron content in its pulverized slag that was affecting the finished product, the Magnetic Manufacturing Company, Milwaukee, Wis., developed the "High Duty" magnetic separator.

Material is delivered to the separator by means of a drag flight conveyor. The feed is controlled by an adjustable positive feed hopper. Two independent stationary magnets arranged in staggered relation are mounted in a fixed position within the frame. Pressed steel cylinders of uniform size are mounted on substantial flange end members. These cylinders are made to revolve on ball bearings and are driven by hardened steel roller chain over machine-cut steel sprockets. The magnets are designed to produce a maximum magnetic field at the working face of the cylinder, and to provide for automatic discharge of the iron removed.

The separator is driven by fully enclosed d.c. motor. Direct current is also used to energize each magnet. Lead wires are protected by armored steel conduit. The frame is of substantial steel construction, firmly bolted and braced. A fully enclosed safety switch having ample resistance mounted therein to fully protect the magnet windings against breakdown together with motor control is attached to switch panel mounted on frame.

A dust collector system has been installed and the magnetic separator has been fully enclosed.



As a result of this "High Duty" magnetic separator installation the iron content removed from the pulverized slag is said to amount to a considerable item and is disposed of profitably.

A New A. C. Manual Starter

A new manual across-the-line A. C. motor starter (CH-9115) is announced by The Cutler-Hammer Mfg. Co., of Milwaukee, Wisconsin. Designed to meet the need for an inexpensive manual starter, the manufacturers claim for it such advantages as overload cutouts giving complete motor protection; cadmium plated, double break, roller type contacts; and small size, safety, dustproof enclosing case.

Complete motor protection is obtained during both the starting and running periods. The thermal overload cutouts provide the necessary time interval to take care of starting inrushes without shutting down.

New Switch Throws Motors Across the Line

A new magnetic switch, suitable for throwing squirrel-cage motors directly across the line, or for use as a primary switch for a wound-rotor motor the secondary of which is handled by a drum controller, has been introduced by the General Electric Company. It bears the General Electric designation CR-7006-D-31.

This switch consists of a triple-pole, restricted-blowout type, magnetically operated contactor with normally open interlock, and two hand-reset, temperature overload relays, all mounted on a molded base and enclosed in a drawn-shell, steel enclosing case. It is designed for use on standard voltages and frequencies.

Manganese Steel Available

The American Manganese Steel Company, Chicago, has developed a number of specially designed crawler parts for equipment subjected to severe service which are interchangeable, or which will take the place of or fit into any part now being used.

These parts include one-piece crawler treads, rollers, bushings, pins, hunting tooth split rim sprocket wheels, split rim self-cleaning sprocket wheels, front idlers, upper track rollers, double flanged lower rollers, and single flanged lower rollers.

Totally Enclosed Motor Made by American Electric Motor Company

A new type of completely enclosed ventilated motor with a 40-degree rating, has been perfected by the American Electric Motor Company of Cedarburg, Wis., recently made a subsidiary of the Splitdorf-Bethlehem Electrical Co. An unusual test demonstrates how effectively dust is excluded from the windings of this motor. A glass case was filled with a mixture of sand, iron filings and sawdust until the motor was half covered. An external fan on the motor churned this mixture, filling the air with it and completely surrounding the motor with thick dust. For two weeks the motor was run under these extremely adverse conditions. When the motor was opened the windings were so clean that a permanent magnet brushed over them showed no trace of filings, it is claimed. Nor had any sand or sawdust penetrated the cover.

The enclosed hoods hermetically seal the winding. The hoods are telescoped into a ring fastened to the stator laminations, the surfaces of which are machined.

In cooling this Type P-K motor the air is driven through as well as over the stator laminations. The stator core is perforated, thereby making it possible to remove the heat at the point where it originates. Air in the enclosed portion is agitated by malleable cast fans shrunk on the motor shaft.

The ball bearings are of the cage type. The enclosing hood of the motor can be removed without disturbing the bearing, which remains on its shaft enclosed in its cage. No dust or grit can get into the bearing. Escaping grease is prevented by felt washers imbedded in the cap.

The stator is removable and can be replaced in a few minutes by a mechanic. The top of the slot is sealed by a U-shaped wedge to eliminate possible creeping surfaces from the winding to the core. The ends of the windings are taped well within the slot, to protect against breakdown between the wire and the end of the slot insulation. After the stator is wound it is thoroughly dried in an electric oven until all moisture is evaporated. It is then dipped in an oil and acid-proof varnish. This process is repeated four times.

The rotor is of the usual construction with the exception of its winding. The end rings are electrically welded to the bars forming a practically indestructible one-piece squirrel cage of uniform material.

With the Manufacturers

INDUSTRIAL LITERATURE

Separator Pulley Publication

The Cutler-Hammer Manufacturing Company, Milwaukee, Wisconsin, has included in a new publication comprehensive information on magnetic separator pulleys.

"Magnetic Protection" (*Publication P-26*) details the construction and design of all "C-H" types of separator pulleys. Several tables give the cubic-feet-per-hour capacity of all sizes and the right width and thickness of the belts to be used.

Recording Instrument Catalog

As a part of its business in temperature engineering, the *C. J. Tagliabue Manufacturing Co.*, Brooklyn, N. Y., issues from time to time publications cataloging installations applicable in the cement industry.

Automatic gas analysis indicator-recorders, of which there are a number in use are described in *Catalog 942*. Other similar publications of interest are *Nos. 905C* and *900*.

Electrical Supplies Catalog

Publication of the 1928-1930 catalog of electrical supplies of the *Westinghouse Electric and Manufacturing Company* has just been announced. This catalog presents the electrical and mechanical features and application information for all supply apparatus and appliances manufactured by the *Westinghouse* company, and in addition describes and illustrates a representative list of large motor and generating apparatus.

All equipment obtainable through district offices or agent-jobbers is thoroughly described and illustrated. New equipment and modifications of former designs described in the new catalog are numerous and cover a wide variety of applications.

Finish Grind Apparatus

The Traylor Engineering and Manufacturing Company folder describes briefly the capacity and gives a sectional view of the *"Bulldog"* finishing gyratory apparatus. In this machine the upper shell and head are shorter and the concaves are set vertical to provide a crushing angle which permits driving at one-third higher speed than the standard machine, it is claimed.

Palmer-Bee Speed Reducer

The Palmer-Bee Company, Detroit, Mich., has recently issued a new 48-page catalog describing in detail PB-Sykes continuous-tooth herringbone gears. This book also describes herringbone and improved mill type spur gear speed reducers. It contains tables of horsepower ratings and dimensions of standard size units, a list of the advantages over open drives, instructions regarding their lubrication, installation, etc.

Traylor Publication

A 1928 bulletin, *No. 2100*, and superseding *1100*, has quite recently been issued by the *Traylor Engineering and Manufacturing Company*, Allentown, Pennsylvania.

The contents of this 25-page publication are devoted entirely to the *Traylor* Bulldog gyratory crusher, Type T.

C-E Preheaters

A new catalog issued by the *Combustion Engineering Corporation* describing C-E air preheaters illustrates the change in design of the unit made in recent years.

Assembly views, performance charts and some half-dozen diagrams of installations, in conjunction with other Combustion Engineering units, are shown.

G-E Motors

Type BTA motors are described in a newly issued *General Electric Company* 4-page loose leaflet. There are headings such as motor operation, starting torque and starting current, efficiency, power-factor and regulation, and control, and followed by a table of ratings of standard type BTA motors.

The General Electric Company is located at Schenectady, New York.

NEW EQUIPMENT

(*Continued*)

Silent Ratchet Lock Insures Safety from Stoppage Slipping

For large elevators, pivoted bucket carriers, belt conveyors and similar equipment where the load on the vertical lift would cause a backward run of the equipment with interruption of power the Jeffrey Manufacturing Company, Columbus, Ohio, has developed a silent ratchet safety lock. It is said to eliminate danger of backward slippage under a heavy load of stone or coal whenever it is necessary to stop the belt conveyor or elevator. This lock provides protection against spilling a loaded elevator or inclined elevator where an unexpected interruption of power occurs.

NOTES FROM THE FIELD

Branch Sales Manager

The Wagner Electric Corporation, announces that *E. D. Pike*, heretofore in charge of *Wagner Electric Pacific Coast* service operation, is now manager of the San Francisco branch sales office.

Larger Quarters for Brown

The Detroit branch of the *Brown Instrument Company* has been removed to 576 Maccabee Building. *R. W. Mayer* is the district manager.

New Consolidated Offices

The Consolidated Products Company, dealing in used chemical and rock products machinery, have moved to their new location at 15 Park Row, New York City.

Agitator on Display

Between sessions of the Portland Cement Association at the Biltmore Hotel, New York City, on May 21st to 23rd, those attending were given an opportunity to view a working model of the *Minogue* slurry agitator, a product of the *Manitowoc Engineering Works*, Manitowoc, Wisconsin.

More than sixty installations of this equipment are said to have been made in the past year.

Special Assignment Engineer

After an absence of 20 years, *E. E. Arnold* has again become associated with the *Westinghouse Electric and Manufacturing Company*, in the capacity of mechanical engineer for special assignment.

Mr. Arnold has a background of thirty years' experience in designing, testing, consulting and executive capacities pertaining to mechanical engineering.

Arcofrax Folder

Among the new publications gotten out by the *General Refractories Company*, the manufacturers of Arcofrax brick, is a folder entitled *"Two Hot Zone Linings."* Two instances are given in which it is said Arcofrax installations gave seven times the service of the previous lining.

MODERN STEAM GENERATION

STEAM GENERATION is a combined process of heat liberation and heat absorption. The fuel burning equipment, the furnace and the steam boilers must be co-ordinated in one unified design—to assure efficient and dependable performance.

There is no sharp dividing line between the responsibilities of the stoker or burner manufacturer, the furnace builder and the boiler maker. The performance of individual elements is secondary to the performance of the combination—as a unit.

The ultimate goal sought is to produce steam at the minimum cost, giving proper consideration to all the factors which enter into the problem of steam generation.

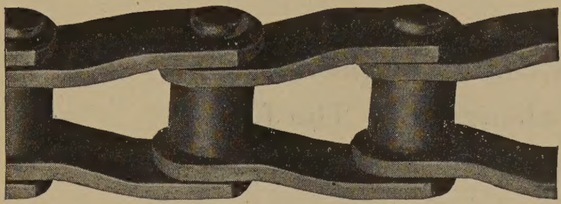
This company offers—one contract, one responsibility—for complete fuel burning and steam generating installations. Typical examples of modern steam generating units installed by this company are shown on the following pages.

Combustion Engineering Corporation

International Combustion Building **200 Madison Avenue, New York**

When Uninterrupted Transmission is Priceless!

Rex Chabelco Never Fails Its Users



Rush production! The whir of wheels! The hum of motors—driving . . . driving! At the heart of it all—taking the heavy punishment—the transmission chains! And they ***must*** stand up.

Rex Chabelco users never worry about their chains. They rely upon the Rex Chabelco pins of ***case hardened forged steel***—upon the accurately milled flat pin ends—knowing that the secure locking of these ends in the broached side bars prevents pin rotation.

They know that Rex Chabelco flexing wear is confined to the pins and their bushings. External wear is taken by the rollers.

Write to us for further information about this remarkable heavy duty drive and conveyor chain. We'll tell you why it's always on the job—the job of serving you economically for a long time.

Philadelphia Branch Chain Belt Co.

ROBERT L. LATIMER & CO.
24 to 28 North Front Street
Philadelphia, Pa.

The "Latimer Line" of Double-Checked Elevating, Conveying and Power Transmission Equipment, Shafting, Hangers, Pulleys, Belting, Mill Supplies.

Important! Fill out the coupon and we will put you on the mailing list for the "Latimer Engineering News Bulletin." This bulletin is issued monthly and contains important news of scientific progress in the industrial world. We gladly mail it without charge.

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Concrete, June, 1928

Output of Masonry, Natural, and Puzzolan Cements Increased in 1927

Statistics of hydraulic cements, other than portland cement, in 1927, which include masonry, natural, and puzzolan cements, as compiled by the United States Bureau of Mines, Department of Commerce, show that the nation's production—2,123,868 barrels—exceeded that of 1926 by about 1 per cent. Shipments of these cements from mills in 1927 increased over 6 per cent in quantity and over 2 per cent in gross value. Stocks at the mills decreased and were about 19 per cent lower at the end of 1927 than at the end of 1926.

These statistics represent the output of 11 plants, which are located as follows: One each in Alabama, Illinois, Indiana, Kansas, Kentucky, Ohio, and Pennsylvania; and two each in Minnesota and New York.

The output has been expressed in terms of 376-pound barrels to correspond with the statistics of portland cement.

MASONRY, NATURAL, AND PUZZOLAN CEMENTS PRODUCED, SHIPPED, AND IN STOCK IN THE UNITED STATES, 1926 AND 1927

Year	Active plants	Production Barrels	Shipments Barrels	Shipments Value	Stock (Dec. 31) Barrels
1926	11	2,104,891	2,031,851	$2,820,110	181,928
1927	11	2,123,868	2,158,323	2,881,029	147,473

Standard Coal Contract Perfected

As a result of a recent meeting of representatives of the National Association of Purchasing Agents and the National Coal Association, buyers and sellers of coal will shortly be able to use a standard contract form that should prove mutually satisfactory. The new form is a revision of the Standard Coal Contract form developed by the National Association of Purchasing Agents and which had been in use for some time. The revised form will take care of certain objections previously raised by the coal operators.

Although all differences were settled at the meeting, the desire of the National Coal Association to refer certain clauses of the contract to its marketing committee, deferred complete acceptance which it is expected will be forthcoming at another joint meeting soon to be held.

Ash Grove's Nebraska Plant to Start Operation with New Year

What is probably Nebraska's largest industrial enterprise at the present time is the cement plant being erected at Louisville by the Ash Grove Lime and Portland Cement Company. About 25 per cent of the plant is erected and completion is expected by January 1st.

Preparation of the site, in itself a large undertaking, has been under way since July, 1927. The first year's operation is expected to produce 1,000,000 barrels. Two hundred and fifty men will comprise the operating force.

The Ash Grove company has 1,500 acres of land in this project. The plant itself and tracks that serve it extend for three-quarters of a mile east of Louisville, adjoining the cliff containing the limestone to be used.

The main line of the Burlington ran through land on which the plant was to be located. This was shunted north toward the Platte river and away from the cliffs. As it is now, a high cliff of clay must be removed to make room for the primary rock crusher.

The site chosen for the kilns was a gapping hole formerly a limestone quarry. It is now almost filled with sand and silt from the nearby river.